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ABSTRACT

A study examined state initiatives for industry-based skill standards and credentials. Officials in 19 states were interviewed, case studies of programs in 3 states (Georgia, Pennsylvania, and Texas) were conducted, and focus group discussions were held with 25 individuals. State skill standards were generally found to be tied to broader efforts to reform the education system in general and vocational education in particular. The forces driving the development of standards and credentials varied by state; however, business and industry involvement proved critical in all states studied. The methodologies used to develop skill standards have drawn heavily on the DACUM (Developing a Curriculum) process and the work of the Vocational-Technical Education Consortium of States. Many states have already undertaken major initiatives to develop assessment processes, and many states are planning to implement statewide processes that would involve the use of performance-based assessments (including portfolios) together with traditional written tests. No state has yet developed a statewide credentialing process, and development efforts across states and at the national level have been fragmented. (A 10-item bibliography is provided. State-by-state phone survey results and the three case studies are appended along with a list of focus group participants.) (MN)

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State Initiatives on Industry-Based Skill Standards and Credentials

by

Evelyn Ganzglass and Martin Simon

Training and Employment Program ■ Employment and Social Services Policy Studies
Center for Policy Research ■ National Governors' Association

Since their initial meeting in 1908 to discuss interstate water problems, the Governors have worked through the National Governors' Association to deal collectively with issues of public policy and governance. The association's ongoing mission is to support the work of the Governors by providing a bipartisan forum to help shape and implement national policy and to solve state problems.

The members of the National Governors' Association are the Governors of the fifty states, the territories of American Samoa, Guam, and the Virgin Islands, and the commonwealths of the Northern Mariana Islands and Puerto Rico. The association has a nine-member Executive Committee, a Task Force on State Management, and three standing committees—on Economic Development and Commerce, Human Resources, and Natural Resources. Through NGA's committees, the Governors examine and develop policy and address key state and national issues. Special task forces often are created to focus gubernatorial attention on federal legislation or on state-level issues.

The association works closely with the administration and Congress on state-federal policy issues through its offices in the Hall of the States in Washington, D.C. The association serves as a vehicle for sharing knowledge of innovative programs among the states and provides technical assistance and consultant services to Governors on a wide range of management and policy issues.

The Center for Policy Research is the research and development arm of NGA. The center is a vehicle for sharing knowledge about innovative state activities, exploring the impact of federal initiatives on state government, and providing technical assistance to states. The center works in a number of policy fields, including agriculture and rural development, economic development, education, energy and environment, health, information management, social services, trade, training and employment, and transportation. The priorities for the association's research are set by the Governors.

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Executive Summary

States confront the challenge of global economic competitiveness and recognize the importance of a highly skilled workforce to meeting that challenge. Many states are moving ahead aggressively with initiatives to restructure their fragmented workforce development systems and reform their education systems at all levels. To guide these efforts, a number of states are working closely with industries on defining the skills required in the modern workplace. These experiences are lending valuable insights and information to the national initiative to create a national system of voluntary, industry-based skill standards and credentials, which has been launched by the U.S. Departments of Education and Labor.

As envisioned, a national system would provide a common language to improve communications among employers, government, and educational institutions regarding the skill requirements of high-performance firms. It would guide both public and private training and labor exchange activities, as well as promote flexibility and portability of skills across occupations, industries, and geographic areas. The federal government would provide leadership by developing criteria to ensure the quality and integrity of the assessment and certification processes, and by establishing ground rules for how to organize standards and define industries and occupations. The primary state roles would be to incorporate the standards into state education reform and workforce development policies and to infuse them into program and curriculum design, performance measures, and occupational licensing and regulation processes. States also would be responsible for certifying the entities that may award credentials and for promoting continuous improvement in the quality of programs. Business and industry would assume the lead role in developing the skill standards and credentials. They also must be involved in the implementation and ongoing upgrading of the system.

The following observations, which emerged from interviews with officials in nineteen states and focus group discussions, reinforce this vision and identify important issues to inform the national initiative.

- State skill standards often are tied to broader efforts to reform the education system, particularly vocational education, and efforts to develop a competitive workforce.
- The leadership driving the initiative varied from state to state and included Governors, state legislators, and state education administrators. Yet in all cases the involvement of business and industry as key players has been critical.
- The methodologies states have used to develop skill standards are directed primarily to the improvement of program design and the development of competency-based curricula. These methodologies draw heavily on the DACUM (Developing A Curriculum) process and the work of the Vocational-Technical Education Consortium of States (V-TECS).
- States have undertaken major initiatives to develop assessment processes. Many states are planning to implement statewide processes and are exploring

the use of performance-based assessments, such as portfolios, in addition to more traditional paper-and-pencil tests.

- Although states have emphasized the importance of portable credentials as part of a national system, none of the states surveyed has developed a statewide credentialing process. The certification that exists generally is provided through industry associations and state licensing agencies. Before states can implement credentialing systems, some fundamental questions must be addressed, including who will administer the certification, who will award the credential, and who will assume liability in the credentialing process.
- Current efforts to develop skill standards and credentials often are fragmented within states and certainly across states, and are similarly fragmented at the national level.
- The development of skill standards and credentials—a time-consuming and costly process—is difficult for states to undertake on their own.

There is strong support among the survey states for the development of one comprehensive national system of skill standards and credentials. Without such a structure, there is a danger that the various national, state, and industry initiatives now underway will develop in different directions and become entrenched in their respective approaches. However, the national system should build on current state efforts; promote competency-based, portable credentials; and give states and the private sector flexibility in determining the appropriate use of standards.

Standards developed within the system should reflect the skill requirements of entry-level and more advanced levels of employment. The standards could be used by both the public and private sectors to improve the quality of their investments in education and training. Individuals could use the standards to assess and certify their knowledge and skills.

A major effort must be initiated at the national and state levels to build awareness and support for a national system among employers, workers, educators, and the general public. If skill standards are valued and recognized as a lever for change, they can contribute significantly to raising the skills of the American workforce and improving the competitiveness of U.S. firms.

1. Introduction

A consensus is emerging among leaders of industry and organized labor; representatives of federal, state, and local government; educators; and training providers that the United States should emulate other industrialized nations and create a national system of voluntary, industry-based skill standards and credentials. These standards and credentials would reflect the changing skill requirements of work in the competitive international marketplace. At a minimum, they would identify the knowledge and skills needed by workers at career entry. Many argue that standards also should be set regarding the knowledge and skills needed to perform satisfactorily at more advanced levels within given occupations.

How Standards and Credentials Can Help

A system of skill standards and credentials can be the driving force to effect changes in curriculum, pedagogy, and assessment practices throughout the education and training system. This would include academic and vocational programs at the elementary, secondary, and postsecondary levels; second-chance education and training programs; and employer-provided training. A competency-based credential that certifies job-related skills—whether attained in school, on the job, or elsewhere in the community—should facilitate articulation among the various education and training providers and enhance worker mobility by creating pathways for career development.

Standards can help people gauge where they are relative to local labor market standards and world standards. They can raise people's perception of occupations that do not require a baccalaureate degree. Hopefully, standards may motivate those who lack the necessary skills to participate in lifelong education and training activities in order to safeguard their employability.

Standards also can provide critical benchmarks for state economic development and customized training programs that upgrade and retrain frontline workers. They provide the foundation for a coherent set of performance standards that can be applied across the diverse and largely uncoordinated vocational-technical education and employment and training systems. Finally, as employers and educators take these standards seriously, employers will use them to make hiring and promotion decisions and to guide the content of employer-provided training, and educators will recognize these standards within their own credentialing systems.

The National Initiative

In 1992, the federal government launched an initiative to create a voluntary national system of industry-based skill standards and certificates as part of a national workforce development and education reform strategy. Over the next two years, the U.S. Departments of Labor and Education are investing more than $7 million—an amount that is being matched almost equally by the private sector—to pilot test approaches to the development of skill standards and certification processes. The initial industries targeted by the federal grants are those accounting for up to 40 percent of the current workforce, so there is the potential for a significant impact on the total workforce within a relatively short time. Additional investments with other industries also are planned.

To guide their education reform and workforce development initiatives, a number of states have worked extensively with industries on defining the skills required by successful firms. Their efforts can inform the national development initiatives of the U.S. Departments of Labor and Education and other national organizations.

National Governors' Association Project

The National Governors' Association (NGA) is conducting a fourteen-month project under a grant from the National Center for Education and the Economy as part of the center's Workforce Skills program funded by the DeWitt Wallace Reader's Digest Fund. The purpose of the project is to inform the national initiative launched by the U.S. Departments of Labor and Education on the experiences of states, public and private occupational regulation systems, and other countries in setting skill standards and establishing assessment and certification processes. The project will explore models for consideration, identify key policy issues, and provide recommendations on the structure of skill standards, on assessment and certification strategies, and on an institutional framework for establishing and maintaining a system of skill standards and credentials.

The first report under the NGA project documents existing state initiatives and presents case studies of states with major initiatives underway in establishing skill standards and credentials. Following this report will be three complementary reports: one will summarize the use of performance assessments in education, a second will document the diversity of existing skill standards and certification systems by illustrating the wide array of occupational regulation systems in the United States, and a third will present the findings of a comparative study of three international experiences. Additional papers will address key policy issues that emerge from these reports.

This report summarizes the results of the study on state initiatives to establish skill standards and credentials. Most of the information contained in this report was obtained through a phone survey with officials from nineteen states. It includes a description of each state initiative and the issues confronted by these states as their initiatives evolved. The survey information is summarized by state in Appendix A.

Supplementing the survey data is information from case studies of three of the nineteen states, which were selected to represent states at various stages of development. The case studies explore how these states are dealing with the technical and structural issues that cut across their initiatives in the elementary and secondary, postsecondary, and employment and training systems. Detailed case study reports are included in Appendix B.

In addition, NGA convened a focus group of state and national representatives for an in-depth, two-day discussion to review and refine the issues identified through the survey and case studies. A list of focus group participants is provided in Appendix C.

This report describes the contextual environment in which the state initiatives have evolved. It details the status of state development efforts, including the key players, progress in setting standards and creating a system framework for assessment and certification, and the extent of coverage of state activities. It concludes with the states' vision for a national system of industry-based skill standards system and their recommendations on appropriate federal, state, and private sector roles. The report provides an important state perspective on the development of skill standards in the United States. In addition to describing state activities, it identifies key policy issues that have emerged from state initiatives to date and analyzes their importance relative to national efforts.

2.

Context for Developing State Initiatives On Skill Standards

Three streams of state reform initiatives are coming together to influence the development, assessment, and certification of occupational skill standards:

- initiatives to improve the quality and credibility of vocational education, especially at the secondary level;
- initiatives driven by the call for broad-scale, outcome-oriented education reform; and
- initiatives to create a more coherent and comprehensive state workforce development system.

Quality Improvements in Vocational Education

The factor the survey states cited most frequently as motivating them to take on the task of developing standards and credentialing systems was to improve the quality of their vocational training programs in order to respond to technological changes in the workplace. In many cases, the private sector had raised serious concerns about the skill levels of workers "graduating" from education and training programs. In response to these criticisms, several states have begun developing occupational proficiency tests that will be given to students at the end of their sequence of courses. The latest strategy to increase program credibility is to offer employers a guarantee that students completing specified courses will be able to demonstrate the required skills documented in their student portfolios or be retrained at the expense of the school. This strategy is being implemented in a few states, including Georgia, Ohio, and Pennsylvania.

Many of the state initiatives are tied to the provisions of the Carl D. Perkins Vocational and Applied Technology Education Act of 1990, which requires states to develop and implement a system of core measures and standards for assessing the performance of secondary and postsecondary vocational education programs. These measures must include learning and competency gains for basic and advanced academic skills. They also must include one or more measures of student competency attainment in job and occupationally related skills, using the state's system of core standards and measures of performance as the base.

Vocational education system reforms have been initiated in several states. In Vermont, the Governor's Commission on Getting Ready for Work proposed a blueprint for restructuring vocational education as part of elementary and secondary education and adult education reforms. In 1988, the Iowa state legislature conducted a study that raised serious concerns about the quality of secondary and postsecondary occupational training programs in the state. Based on the results of that study, the legislature enacted a law mandating a minimum set of standards and requirements for all educational programs. Similar action was taken by the Ohio General Assembly, which enacted legislation that called for accelerating the modernization of vocational education in the state. This prompted the Ohio Department of Education to bring together a forum of business, industry, labor, and education leaders to recommend modernization strategies. Ohio Competency Analysis Profiles (OCAPS) were developed that list performance standards and occupational, academic, and employability competencies for specific occupational areas.

States also have made substantial progress in creating a more outcome-based approach to managing vocational education programs as required by the Perkins Act. Although states were required to develop and implement only two measures and standards by fall 1992, all fifty systems contain more than the required two. States have developed selected measures in the outcome areas of academic achievement, occupational achievement (general and job-specific skills), retention, placement, employer/client satisfaction, and service to special populations. Most states are using the current school year to collect data in order to set appropriate standard levels. In addition, states are determining appropriate ways to measure academic gains and occupational competency at the secondary and postsecondary levels.

Several states have developed different strategies for implementing the Perkins Act performance standards requirements at the postsecondary level because of the strong tradition of decentralized governance at this level. For example, New York has moved ahead with setting standards for vocational education programs at the secondary level, but it is requiring postsecondary institutions that are recipients of Perkins Act funds to summit a plan for how they will set standards and assess and document students' attainment of these standards. There is resistance to state direction at the postsecondary level because of concerns that skill standards may compromise academic freedom as well as devalue the associate degree and New York's graduation requirements for postsecondary education. Similar resistance has occurred in other states. However, in states such as Florida, Iowa, and Ohio, standards are being applied in both secondary and postsecondary vocational education programs.

Outcome-Oriented Education Reform Initiatives

Since the mid-1970s, America's elementary and secondary schools have worked hard to redefine what students should know and be able to do in order to meet increased societal demands and develop new strategies to better measure that knowledge and skill. During the first phase of the outcome movement, concern over the lack of competency in basic skills such as reading, writing, and arithmetic caused nearly forty states to identify minimum basic skills, develop or adopt tests to measure these skills, and in many places, require passage of these tests to graduate from high school. Education initiatives to help students achieve these basic skills resulted in improved performance among the lowest achieving students.

In its landmark report, *America's Choice: high skills or low wages!*, the National Commission on the Skills of the American Workforce called for a restructuring of high schools and adult training systems, certificates of initial mastery that demonstrate the attainment of foundation skills, and advanced certificates that are pegged to the entry-level requirements in specific occupations. Agreement on the standards students must achieve makes it possible to provide alternative pathways that are best suited to the needs and interests of individual students and that allow them to achieve the skills they need to qualify for either career or college entry. Consistent with these recommendations, in its 1991 report, *What Work Requires of Schools*, the U.S. Labor Secretary's Commission on Achieving Necessary Skills (SCANS) emphasized the kinds of skills and competencies that entry-level workers will need in the workplace and categorized these requirements into three "foundation skills" and five "competencies." The requirements expanded the earlier focus on basic academic skills to include broader workforce preparation skills.

Increasing international competitiveness in the economic arena has resulted in a new wave of standards, assessment, and education reform initiatives that are directed at broadening and deepening the knowledge and skills of all students. The focus is on improving students' ability to integrate knowledge from a variety of disciplines in solving complex problems found in the workplace. The National Educational Goals, which were established in 1989 by the Governors and President George Bush, challenged the nation to develop new curriculum and performance-based assessment processes that demonstrate that "all students can learn at high levels" and that provide the opportunity for them to do so. The goals reflected a bipartisan commitment to restructuring education and shifted the debate from mandated procedures and school improvement to systemic restructuring and reform. Governors have responded to this challenge by launching major education reform efforts as part of a long-term strategy to ensure the economic competitiveness of their state.

Many states have taken steps toward defining the National Education Goals in measurable forms and some have begun developing new assessment strategies designed to measure high-achievement outcomes. In addition, several states have embarked on education reforms that are patterned on the recommendations of the National Commission on the Skills of the American Workforce. These states are planning to abolish the general track and develop a core curriculum for college-preparatory and technical-preparation students. In these states, skill standards will provide the underpinning for improving curriculum, instructional methodologies, program offerings, and the transition from school to work. For example, Oregon's comprehensive education reform legislation requires the development of industry-based skill standards that will serve as the basis for awarding certificates of advanced mastery. The certificates will be awarded upon completion of the twelfth grade and will be pegged to the entry-level requirements in specific occupational areas. Implementation of the skill standards system is being overseen by Oregon's Workforce Quality Council.

States also are beginning to include the SCANS foundation skills in setting standards as part of their education reform efforts. For example, under New York's New Compact for Learning, a Curriculum and Assessment Council has been established to deal with academic standards and to address work readiness skills and cross-cutting foundation skills such as those identified by SCANS. However, to date no decision has been reached on whether the assessment of academic and work readiness will be combined into one system or kept separate. The council has established a subcommittee to develop and certify technical skills, which has moved the debate about certification and technical skills beyond the vocational education system.

Education reform initiatives at the elementary, secondary, and postsecondary levels have led to a great deal of ferment in the areas of assessment and certification. One of the most far-reaching efforts related to standards and assessment in the elementary and secondary school arenas is the New Standards Project, a joint venture of the National Center on Education and the Economy and the Learning Research and Development Center at the University of Pittsburgh. The project involves seventeen states and six cities in which almost half of America's children live. It is trying to create a unified national examination system for assessing the achievement of elementary and secondary school students relative to the standards set for these levels. The system will consist of three main components: performance examinations; assessments of student projects, including group projects; and assessments of the contents of student portfolios, which will be assembled by students over time.

The content standards for this work will draw on the curriculum frameworks and standards that are being developed by national professional associations in math, science, English, language arts, and history. The project also will attempt to develop a methodology for establishing the comparability of different examinations in assessing student performance relative to the content standards.

Initiatives to Develop a State Workforce Development System

States confront the challenge of global economic competitiveness and recognize the importance of a highly skilled workforce to meeting that challenge. Many states are moving ahead aggressively with initiatives to restructure their fragmented workforce development systems into a more comprehensive, consumer-driven, outcome-oriented system that is understandable and easily accessible to its customers—students, workers, and employers.

Many of these initiatives include a focus on developing a system of standards and credentials that can serve as the skills-based language to help improve communication between employers and educational institutions regarding workplace requirements. Such a system provides the unifying infrastructure for both public and private training activities, labor exchange services that match job seekers to job openings, occupational information systems, and career guidance, information, and counseling services for those preparing to enter the workforce and those already in the labor market.

In several of the survey states, workforce development initiatives provide the central policy framework that guides reform in education, including vocational education and job training programs, and that is key to building the system of skill standards and credentials. The strong gubernatorial leadership and legislative support manifested in these efforts have been essential to building consensus and reducing resistance and may also suggest a useful model for developing the national system.

In 1991, the Governor of Indiana created a new Department of Workforce Development to function as an umbrella organization for the Department of Employment and Training Services, the Commission on Vocational Education, and the Office of Workforce Literary. The department provides a new focus on workplace skills and career development for schools in the training system. The following year, the legislature created a Workforce Proficiency Panel, composed of representatives from state agencies, business, and organized labor, to oversee the development of technical proficiencies and technical field certificates of achievement for secondary and postsecondary schools.

In September 1991, the Governor of Wisconsin issued an executive order to create the Executive Cabinet for a Quality Workforce. The cabinet was charged with uniting the business, labor, education, and human service departments in an effort to create a high-skills strategy for school-to-work transition.

The Governor of Texas created the Texas Skills Development Program and gave the State Job Training Coordinating Council the lead in developing a Smart Jobs Training Plan to ensure a world-class workforce in the state. The plan will focus on demand occupations, and employers and employees will be involved in identifying and validating the skills and skill levels needed in related jobs. According to many of the state officials who were interviewed, strong support by the Governor was a critical factor in attracting industry support for the initiative and moving it beyond the conceptual stage toward implementation.

3.

Status of Implementation

Key Players Driving State Initiatives

Just as the context within which state skill standards initiatives evolved has varied from state to state, so have the roles of key players. Generally, the Governor, state legislators, and state education administrators have assumed a leadership role in driving the state initiative, with members of business and industry playing a critical support role.

Many of the states' efforts are being driven by key players within the state education system. This is largely because of the national call for education reform and the system's history of developing standards for vocational education programs. Although state education agencies tend to be driving the initiative, they are forging close partnerships with business and industry associations, labor organizations, local secondary and postsecondary education agencies, and in some cases, other government agencies. These partnerships are influencing the development of policy at the state level. Moreover, they provide the basis for developing and validating skill competencies that drive the program and curriculum development and assessment and certification systems being implemented at the local level. The strength of these partnerships greatly affects the quality and acceptance of the standards that are developed.

In states such as Indiana, New York, Pennsylvania, Texas, Vermont, and Wisconsin, the Governor has taken a leadership role in setting the policy direction for the state initiative. In most of these states, the Governor established an oversight board or council by executive order or by working with the state legislature to enact legislation. In other states, including Florida, Iowa, and Ohio, the state legislature has been active in researching workforce development and education reform issues in order to draft legislation calling for standards to improve education and workforce development programs.

Business and industry are playing a critical role in supporting state and local efforts. Their representatives are serving on policy councils, vocational education advisory committees, and technical committees charged with identifying and validating competencies. In some states, industry has been a driving force. For example, employers in Florida's electronic industry began importing workers from other states at a significant cost because often they were unable to find qualified workers within the state. This prompted the Florida Department of Education to initiate a process for involving employers in the development of program standards. In Georgia, the process of setting industry standards began with the Department of Education working closely with the National Institute for Automotive Service Excellence (ASE), the Printing

Industries of America (PIA), and the Associated General Contractors (AGC). Recognizing the need to upgrade the skills of entry-level workers, each association has made a commitment to improve vocational education programs. In Pennsylvania, the National Tooling and Machining Association has been a key player in the state's youth apprenticeship initiative. Survey respondents most frequently cited the active involvement of business and industry as the most important factor in ensuring the success of their initiatives. They said that business and industry must buy into the process if a voluntary national system of skill standards is to succeed.

Some groups are voicing concerns about the development of skill standards and credentials. Several state officials report resistance from various groups because of concerns about the potential impact of standards and credentials. In some states, organized labor has expressed concerns that skill standards could open the door to lower wages or result in the displacement of current workers or the disruption of promotional opportunities. There also is concern that skill standards could be used to water down apprenticeship standards. Some community colleges have resisted the development of statewide skill standards because they fear that an emphasis on credentialing could devalue the associate degree. Other groups have expressed concern that standards for entry-level employment might be set so high that they would create barriers to employment for those who fail to meet the standards and who are not afforded the opportunity to catch up.

The Process of Developing Skill Standards and Credentials

States have used similar methods to develop skill standards. This is largely because of the long history of developing competency-based curriculum in vocational education, the extensive work of the Vocational-Technical Education Consortium of States (V-TECS), and the acceptance of the DACUM (Developing A Curriculum) process as an effective approach for involving business in developing standards.

Long before the issue of developing outcome standards was incorporated into the broader education reform debate, the vocational education system had begun identifying the skills and competencies needed for employment to serve as the basis for curriculum development. In competency-based programs, curriculum is structured by identifying competencies that students need to learn, developing curricula materials to teach competencies, assessing students on their mastery of the skills, and advancing students through the program as they gain competencies. Assessment by the instructor or the workplace supervisor is an integral part of the instructional process, not an accountability tool.

In its nineteen-year history, the twenty-three states in V-TECS have promoted competency-based vocational education. They have developed worker-validated standards of performance for 170 occupational domains addressing more than 700 *Dictionary of Occupational Titles* (DOT). As a result of the Perkins Act performance standards requirements, the competencies developed to guide competency-based instruction are being used as the basic building blocks for the new accountability system. States are rewriting competency statements so that they are more easily measurable and states are involving industry associations in validating competencies and endorsing credentials to be awarded based on these measures.

The process most of the survey states are using to develop industry-based skill standards is a modified version of the DACUM process—a process that relies on brainstorming with incumbent workers to identify tasks. The modification of DACUM usually entails the following steps:

- developing duties and task lists based on the work of V-TECS and that of other states;
- forming a technical committee of eight to twelve incumbent workers and managers;
- having the committee review the list of duties and tasks and construct a list of core competencies for a specific occupation or cluster of occupations;
- involving a second group of industry experts to review the lists; and
- returning the lists to the technical committee for final validation.

The process usually does not include instructors in validating the competency lists, though this varies by state. In many states, it is the responsibility of groups of instructors to translate the competency lists into measurable learning objectives and curriculum.

The challenge identified by the survey respondents and focus group members is to develop standards that are broad enough and flexible enough to accommodate changing workplace requirements, but that are specific enough to be useful to employers and clear enough to be understood by the general public. Several state officials questioned whether the process for developing standards commonly being used by states will produce this result. They suggested the need to explore new approaches for developing skill standards. They urged that standards be developed to reflect the totality of the industry, not the narrowness of traditional occupational classifications and task-based approaches.

At least two states decided to start from scratch in developing skill standards rather than rely on existing task lists from V-TECS, other states, or the DACUM process. In Illinois, the state funded a pilot project to develop standards for manufacturing technology as part of an initiative to establish a youth apprenticeship program in that field. Employers started with a clean slate to ensure that the standards were world class. Employers had greater ownership of the standards as a result of their participation in the project. Florida officials believe that the method the state used in developing skill standards is an improvement over the DACUM process used by other states. Florida's approach involved the incumbent workers more directly and for a longer period, asking them to identify competencies required for specific occupations rather than brainstorm on what they do on the job.

Several survey respondents noted that the process of developing core competencies was arduous, time consuming, and costly, though they did not see the development and validation of standards as the most difficult task. Getting educational agencies and businesses to accept and use the standards is seen as the greater challenge. Meeting this challenge requires a significant promotional effort led by knowledgeable staff who can communicate effectively with educators and employers.

Framework and Definitions

There appears to be a great deal of confusion about the terminology and concepts associated with skill standards. States participating in the telephone survey used the term "skill standard" to mean different things, including curriculum standards validated by employers, criteria used for program certification, and achievement standards against which individual competence can be assessed and certified. Other terms commonly used in discussing skill standards and assessment and certification processes also lack a clear definition. These terms include skills, competencies, tasks, duties, certification, occupations, and occupational clusters.

Although several interviewees discussed plans to develop different certification levels, it is clear from their comments that the meaning of this concept is far from uniform. For some, different certification levels related to recognizing individuals' different proficiency levels. Others thought about different certification levels in terms of the different levels of education (e.g., tenth grade, high school completion, and postsecondary level) at which skills would be certified. Still others used the concept of levels to describe the amount of specialization demanded within an occupational area. Certification levels also are frequently discussed as a way to distinguish between the diverse skill demands of firms organized along a Tayloristic model, firms that have adopted employment practices and ways of organizing work associated with high-performance work organizations, and presumably firms in between these two models.

Because of these pervasive definitional problems, it often is difficult to sort out real differences from semantic differences in states' approaches to setting skill standards and developing assessment and certification processes. For example, the different educational levels for which standards are being set already have led to some confusion about the breadth of occupational clustering that may be appropriate for skill-setting purposes and the nature of standards to be developed. Although the purpose of skill standards is to develop a common language across workforce development activities, the diverse mixture of occupations for which standards are being developed and the different terms used in conjunction with this process are likely to cause confusion among employers, job seekers, and students and their parents.

Recognizing these definitional problems and the importance of reaching consensus on how standards should be structured, many of the state officials interviewed are looking to the national level for guidance on questions such as whether standards should be structured around industry, occupations, or occupational clusters; whether standards should be stated in terms of skills, tasks, or duties performed; and how the issue of different certification levels should be defined.

Although focus group members offered no clear definitions, they recommended that standards reflect the knowledge and skills that will be assessed, not the discrete tasks or content that must be taught. These standards, including required proficiency levels, should be defined holistically. This means that they should emphasize the integration of knowledge and skills necessary to perform units of work or duties that are associated with an occupation or occupational cluster. For the most part, occupations or occupational clusters would be associated with particular industries, but they also might cut across industry boundaries.

Assessment

The survey states are using a variety of assessment strategies to measure student achievement of skill standards. These include instructor-administered paper-and-pencil tests, school and work-based performance assessments, and student portfolios. Decisions about what assessment methods or instruments to use traditionally have been made as part of program design by local secondary and postsecondary education institutions. However, several states, including Ohio, Oklahoma, Oregon, and Vermont, are developing statewide assessment processes.

Illinois is developing an assessment system at the secondary and postsecondary levels that includes pre-testing of program participants and post-testing of program completers to determine competency gains. At the secondary level, the state is pilot testing the pre- and post-testing using an already developed workplace skills test; statewide implementation of the testing will occur next year.

Oregon has funded ten school-based pilot efforts to develop performance-based assessment models that, together with other models, can be adopted by other sites throughout the state. Oregon also is one of the charter states working with the American College Testing (ACT) Service to develop a system for assessing workplace competencies.

As states consider statewide assessment strategies, some changes are occurring, but the traditional approach still prevails. Vermont's statewide assessment program includes both performance-based assessment and portfolios. Within the state's vocational education system, portfolios are being used to assess occupational and technical skills, and the Test of Adult Basic Education (TABE) is being used to assess academic skills.

Because of the heightened interest in assessment resulting from the Perkins Act performance standards requirements, there also has been a lot of activity within the vocational education system. Oklahoma has decided to turn over to V-TECS the occupational competency tests it has developed for more than 200 occupations as part of the state's work with the consortium. V-TECS will work with industry to validate the tests nationally. To date, the tests have been used throughout the nation within programs, but generally they have not been used for pre- and post-testing or skill certification. Beginning in 1995, Oklahoma will require all of its secondary and noncollegiate postsecondary programs to pre- and post-test all students using either the state-developed tests or others approved by the state. The state will require the use of the ACT test of basic skills at the collegiate level for pre- and post-testing of academic skills, but let colleges choose which tests to use for assessing occupational skills. Performance-based assessment will be conducted during the program to save costs and simplify logistics.

Also as part of V-TECS, New York has developed tests for its business education and health care programs to give these programs greater credibility. The state plans to move to performance-based assessment over time and to develop additional tests in occupational areas for which there are large vocational education programs. Kentucky uses its Assessment in Vocational Achievement Test and is beginning to pilot test performance-based assessments at the secondary and postsecondary levels. Ohio is developing validated, criterion-referenced, paper-and-pencil tests to be used statewide by local educational agencies for pre- and post-testing of students in each occupational area. The tests will measure students' competency gains for performance standards purposes. They are scheduled to be implemented in the fall of 1993. Illinois also is developing a system for mandatory pre- and post-testing of vocational education students at all levels. Results from the test of workplace skills, which was developed by the state as part of V-TECS, will serve as the baseline measure.

States increasingly are looking to portfolios as an important component of their comprehensive assessment systems. This is because portfolios offer individuals with situations that have served as barriers the opportunity to select their own projects and demonstrate mastery of specified skills at their own speed and in ways that play to their strengths. Portfolios have been compared with the Boy Scout merit badge system, in which youth are able to accumulate achievement badges over time.

Ohio has developed a portfolio called a "Career Passport" that contains formal documents measuring achievement, including test results that identify and describe the marketable entry-level skills of program completers. Iowa encourages but does not require the use of what it calls "performance transcripts." Pennsylvania's youth apprenticeship program plans to use portfolios to document the results of the program's ongoing process for assessing students' academic performance and demonstrated job-related competencies. Students are being required to maintain their own portfolios, with employers and teachers reviewing the contents for accuracy and completeness. Other states, including California, Florida, Georgia, Indiana, Maine, Vermont, and Wisconsin, have similar policies.

Several of the states interviewed for this study have received early indications that prospective employers will accept the information contained in the portfolios as evidence of student capabilities. In Vermont, members of the Business Roundtable have made a commitment to ask all completers of vocational education courses for their portfolio. In Pennsylvania, employers involved in the state's youth apprenticeship initiative indicated that during the hiring process, they were more interested in using a portfolio that contains information about job applicants' specific job-related accomplishments than in having students credentialed through a certification process. They reasoned that the portfolio would allow them to make their own judgments about the adequacy of job applicants' skills, while a certificate of mastery would be based on other people's assessment.

Although a growing number of states are exploring the use of portfolios, questions already are being raised regarding the legality of their use for hiring purposes. The case law clearly documents the constraints on using testing for screening individuals for employment. Employers must be able to show a direct relationship to the requirements of the job if they use portfolios or other forms of credentials in the hiring process.

As the discussion of skill standards continues to evolve, there also is increased interest in expanding the use of performance-based assessment for accountability purposes. Many people in the education and training community believe that this technique can better assess the application and integration of knowledge and skills to solve real-world problems than can traditional, standardized paper-and-pencil tests.

However, states face several problems in using performance-based assessment to ensure accountability. First, it is difficult to maintain consistency and reliability in how performance or products are assessed or rated. To address this issue, for three years Oklahoma pilot tested the designation of school testing liaisons in selected schools in order to maintain the integrity of the assessment process. The state now plans to train a staff person in each secondary school to serve this function.

Second, most states have not considered establishing a third-party assessment and certification system conducted, for example, by trade associations that could provide an externally validated source of information on skill attainment. Most of the respondents assumed that skills would have to be assessed and certified as an integral component of the training program because of logistics and cost. However, embedding assessment in training programs may be inappropriate for assessing and certifying (and periodically recertifying) the skills of incumbent workers. These workers may have learned the skills and knowledge informally on the job, not in a training program.

Certification

At the time of the survey, none of the states interviewed had developed a statewide process for certifying individual competency that covered all occupational programs. To the extent that credentialing of individuals exists, it usually is in licensed occupations or it is linked to the completion of one of several industry-certified or industry-accredited programs. Several states are developing statewide certification processes that will be implemented during the next few years. Others are using portfolios and "warranties" (skill guarantees) as a form of credentialing.

Vermont is planning a statewide certification process that would go beyond certifying the skills of those who complete a certified vocational education program. Individuals also will be able to get certified if they have completed a youth apprenticeship or passed an examination. The state is considering the use of outside assessors and the establishment of a state standards board, made up of business and labor representatives and education and employment and training officials, to ensure consistency of program and individual skill standards and certification procedures across industries.

Oklahoma will require the certification of individuals in all programs by the 1994-95 school year, though it now only certifies students in construction, printing, and health care programs. In these programs, students must successfully complete 70 percent on the cognitive part of the assessment and 100 percent on the performance-based portion. The Oklahoma State Board of Vocational Education awards these certificates, but officials would like to have the industry award them. Wisconsin is moving in this direction; it plans to make the assessment and certification of program participants a joint responsibility of employers and educational agencies.

A portfolio in Ohio, called a "Career Passport," serves as a credential. It contains the formal documents that identify and describe the marketable skills of the student completing a vocational education program. The state is working on a statewide assessment process that will cover forty-nine occupations when it is implemented in the fall of 1993.

Georgia is just beginning to implement an assessment process. It is using program certification standards to improve the quality of programs and is underwriting start-up grants to upgrade equipment and materials and provide staff development for teachers and schools seeking certification. Because about 25 percent of Georgia's vocational education students are participating in industry-certified programs, they are subject to the state's portfolio requirements and skill performance warranty, which is tied to skills documented in the student's portfolio.

Several other states have "warranty" or "guarantee" provisions that put teeth behind the certification process. Kentucky was one of the first states to develop and implement a guarantee program that guarantees employers that graduates from the Kentucky Tech System are competent in the skills for which they were trained. If graduates do not demonstrate this competency, they will be retrained at no cost to the employer or student. Ohio also provides a performance warranty and, like Georgia, has tied it to the skills documented in student portfolios. The member states of the Council of Great Lake Governors are working together to develop a guarantee that will extend across the region.

In most of the survey states, skill standards are linked to certification of vocational education programs. Skill standards drive program design and curriculum development, not certification of individual skills. However, in response to the Perkins Act requirements, states are redefining the skill standards that have been used for program certification in order to certify individual competencies. In doing so, they are confronting issues such as who will administer the credentialing process and who will award the credentials. Other issues are who assumes liability in the process and at what stage. Some states are partially assuming liability by offering warranties to employers if program completers cannot demonstrate the competencies that should have been gained from their participation in a course of study. This does not address the issue of an employer's liability for adding skill requirements during hiring that do not directly apply to the job to be performed.

States also are considering whether to establish multiple levels of certification. A few of the survey states have developed certificates of initial and advanced mastery, similar to those called for in *America's Choice*, as a first step toward recognizing progressive achievement levels. These certificates eventually must be connected to work-based assessment and certification processes.

In developing certification processes, states must weigh a variety of sometimes conflicting needs. For example, to assist in the labor exchange process, states must provide a portable credential that reflects the demands of high-performance workplaces but also satisfies the legal requirements of job-relatedness embedded in hiring and promotion practices. States' development of certification process also must recognize and reflect sensitivity to the concerns of interested parties. For example, organized labor has expressed some concerns that a system of skill standards and credentials will displace current workers or disrupt their pathways to promotions. This group also is wary that standards will be used to water down apprenticeship programs and will open the door to wage reductions.

Extent of Coverage

It is too early to determine the number of occupations that eventually might be covered by the various state skill standards and certification systems. Iowa's skill competencies cover 135 occupational areas, Ohio's forty-nine, Maine's thirty-two, and Georgia nine. For the most part, the number of occupations for which skill standards have been or are being developed has been driven more by the types of programs being offered and the relative enrollment in these programs than by the prevalence of different occupations or the changing nature of work, though presumably this is reflected in the content of the programs offered. Yet states such as Indiana and Oregon, which have initiatives to develop comprehensive workforce development systems, are planning to select occupations for standard setting by focusing on key occupations within the state that have the most potential for growth rather than by focusing on available programs.

Most states have developed standards that can be used to certify skills at the completion of a sequence of secondary-level vocational courses. Other states are developing standards that can be used to award certificates of advanced mastery—typically upon completion of the twelfth grade. Several states are focusing on specific industries, such as metalworking, automotive services, printing, or construction, and are working closely with the relevant industry association. A few states also are developing standards for advanced occupational levels that will allow for greater specialization within occupations and eventually affect the training of incumbent workers.

Summary of State Activities

Highlighted below are state skill standards activities, including occupations covered, key assessment and certifications strategies, and future plans. Expanded summaries for each survey state are included in Appendix A, and reports on the three case study states are contained in Appendix B.

In Arizona, competencies have been developed and validated for seventy vocational-technical education programs across the state. These programs are targeted to entry-level jobs and youth in school-to-work transition. No estimates are available on the number of workers or students who are affected. Standards are organized around industries and occupational clusters. Although there is some form of occupational assessment in every elementary and secondary school district, there is no statewide occupational competency assessment.

Arkansas has standards for its secondary vocational education programs in automotive services and building trades. A third program for child development associate is provided jointly as a high school and postsecondary program and results in a credential. The state also is initiating a youth apprenticeship program in six sites that will require a credentialing system.

California is creating regional collaboratives around the state to define what occupational area will be covered by the schools in the area. The state will start developing standards for health care, graphic arts, banking and finance, and telecommunications programs. The standards will target all worker populations, including entry level, youth in school-to-work transition, existing workers, and welfare-to-work participants. Assessment and certification processes have not yet been developed, though it is proposed that students will be assessed and certified based on their portfolio and skills demonstrated within existing programs.

Florida has competency standards for electronics programs and several related specialty areas such as telecommunications, autotronics, and laser-electro optics. Standards also have been developed for programs in automotive technology, automotive collision, and culinary arts. The standards are being implemented in thirty-nine community colleges and area vocational centers as well as in all secondary schools. Florida has full articulation of common courses between secondary and postsecondary programs. The assessment of student competencies is built into the program design. Florida does not have a statewide credentialing process, but it has developed a working transmittal document, called a "Career Map," that is required statewide. The Career Map documents what courses a student has completed and the competencies gained in each course.

Georgia's system includes nine categories that define the standards upon which programs are certified. Nine occupational areas are covered by the system, including auto mechanics, auto body, graphic arts, forestry and horticulture, marketing education, business education, and home economics. The standards apply to secondary vocational education programs that prepare students for entry-level jobs. At this time, the system affects up to 25 percent of the student population. Assessment of student competencies is built into the program design and is conducted by the instructors for each program. The state is in the early stages of developing a credentialing process and plans to set standards for metalworking, electronics, and health occupations in the near future.

Illinois is working with business and industry to set skill standards for manufacturing technology, information processing, electronics, food services, and nursing. State officials also are working with the Illinois Manufacturers Association to develop a youth apprenticeship program in manufacturing technology that will have world-class standards. In addition, the state is developing an assessment system at the secondary and postsecondary levels that will include pre-testing and post-testing of program completers to determine competency gains. At the secondary level, the state is piloting a pre- and post-test using an already developed workplace skills test. Illinois' community colleges are exploring the use of certification as the basis of a guarantee, but the guarantee has yet to be developed.

Indiana is working on the conceptual framework and policy foundation for a standards system. The state also is exploring options for assessment, certification, and program accreditation. The full extent of coverage for workers in the system has not yet been determined, but the focus of development is on entry-level jobs and school-to-work transition programs. Indiana is planning to focus on the occupational areas of automotive services and health care as the starting point for developing skill standards. It also plans to examine those occupations with existing licensing or industry certification for initial development. Indiana currently has certification and licensing in automotive and health care occupations.

In Iowa, there are skill competencies for six broad vocational program areas: agriculture education, business and office education, home economics, health occupations, industrial education, and marketing education. The competencies cover approximately 135 occupational areas in the postsecondary system and fifty-four areas in the secondary school system. An estimated 97,000 students are enrolled in programs for which competencies have been developed. At this time, Iowa does not have a standard statewide assessment and certification process. State legislation requires local schools to develop and administer performance-based assessments. However, there is no statewide effort, and responsibility rests primarily with the instructors.

Kentucky has standards for auto mechanics programs that were developed by the National Institute for Automotive Service Excellence. The initiative is being expanding to include standards for diesel mechanics and auto body. Upon completion of a pilot test, it is expected that performance-based tests will replace the paper-and-pencil tests currently used for these three occupations. The state also is developing a certification program for its refrigerant recovery program that will train and certify incumbent workers.

Maine has a system of core competencies for thirty-two occupational programs that are available to secondary vocational education students who are preparing for entry-level jobs. The competencies do not apply to the postsecondary education system. At this point, there is no statewide assessment and certification process for vocational education programs. In response to the 1990 Perkins legislation, the state Department of Education developed and distributed a format for pre- and post-testing of vocational education program participants that local school districts can use at their discretion.

In New Jersey, skill standards are being defined as "core proficiencies" or "competency standards." The standards will cover secondary vocational education programs that prepare students for entry-level jobs in a variety of occupations. Competency lists are being developed for up to 100 occupational areas, including carpentry and secretarial jobs. Assessment of student competencies is embedded in the occupational programs and is primarily instructor-driven. To the extent that certification of individual skills occurs in New Jersey, it is tied to state licensure laws for specific occupations or is provided through industry trade associations.

New York's Compact for Learning requires the state to set standards for the elementary and secondary school systems. Thus far, the state has concentrated on academic skills, but it is now starting to address workforce preparation skills. Before certification of technical skills became part of the larger debate on education reform, the state vocational education system had developed occupational proficiency tests for business and health care programs. State officials have decided not to move ahead with the development of skill standards until broader issues related to technical skills assessment are resolved.

Ohio has developed Competency Analysis Profiles that list occupational, academic, and employability competencies and performance standards for forty-nine occupational areas. There are sixty-three areas of study when subcategories for certain occupational areas are included. The system covers secondary students and adults in postsecondary programs who are preparing for entry-level jobs. About 300,000 adults are enrolled in vocational education certificate programs. Ohio is developing validated competency pre- and post- tests for each occupational area, which will be implemented statewide in the fall of 1993. Although Ohio does not have a certification process, it has adopted a Career Passport as the learning credential that identifies students' competencies in each occupational course of study. In addition, some of Ohio's school districts are backing up the Career Passport with a two-year guarantee to employers that students have the skills for which they have been trained.

Oklahoma has industry-endorsed skill standards for eight occupations in the construction industry that were developed in partnership with the Associated General Contractors. These standards have been incorporated into all of the state's programs. Oklahoma's vocational education system also coordinates the certification of seven nurses aides occupations in a joint effort with the Oklahoma Department of Health. Nurses aides tests will be incorporated into the programs early in 1993. By the 1994-95 school year, all programs in these seven occupations will be required to certify individual program completers. In addition, during the past twelve years, Oklahoma has developed a competency-based testing system for more than 200 occupations covering 90 percent of the programs the state delivers.

Oregon's comprehensive education reform legislation, enacted in 1991, requires the development of industry-based skill standards. It also calls for the development of certificates of initial mastery and advanced certificates that are tied to entry-level requirements in specific occupations. The state is working through local education agencies and vocational education technical committees to articulate skill standards in industries that are likely to be key to Oregon's future economic success. The state also is working on creating a statewide performance-based assessment system for the elementary and secondary school systems. Ten school-based pilot efforts are underway to develop assessment models that can be replicated. Work has not yet begun on planning for the development and implementation of a certification process.

Pennsylvania has developed workplace competency standards as part of its youth apprenticeship demonstration program in metalworking. Approximately 100 students enrolled in the program in the fall of 1992 in four regions of the state. The state plans to have credentials for the first students by the end of the 1992-93 school year. Pennsylvania's assessment process will rely heavily on portfolios that include both academic and work-based achievements.

Texas has been working on the conceptual framework and policies for industry-based standards for two years. It devised and tested a standard-setting methodology that targeted two occupations within the business/management services industry: systems analyst and computer operator. However, the state found the test model obsolete and the process too expensive. Texas is assessing its next step with an eye toward developments at the national level.

Legislation enacted in 1985 authorized Vermont to develop competencies and tasks for occupational, academic, and employability skills. Following the passage of this legislation, the state developed competencies and tasks for all of the programs available through its regional technical education centers. In response to the Perkins Act requirements, the state is now modifying these competency and task statements to make them more measurable. Vermont also is building on these competencies to meet industry certification requirements.

Wisconsin's skill standards are being developed in conjunction with its school-to-work transition and youth apprenticeship programs in metalworking and printing.

Assessment and certification of students will be a joint responsibility of employers and educational agencies. The state also is planning a certificate of competency for certifying initial skill levels.

4.

States' Vision of a National System of Industry-Based Skill Standards

One System

The state officials and focus group members identified a wide range of objectives that must be met to ensure the success of a national system of skill standards and credentials. Most of them believe that to raise the skills of the workforce, the system must focus on both young people entering the workforce for the first time and incumbent workers who need to upgrade their skills to remain competitive. Moreover, it is not enough to raise skills; the system must promote flexibility and portability of skills across occupations, industries, and geographic locations. This will require a better integration of academic learning and work-based learning that can be assessed through commonly agreed-upon measures and then certified. The system must create communication tools among employers, workers, education/training providers, and government that improve the credibility of public services. This should include facilitating information exchange, increasing the accountability and integrity of public investment, and enhancing the efficiency of labor exchange. In addition, the system must promote increased employer investment in training and development of high-performance work organizations. Ultimately, the objective is to build a highly skilled workforce and highly productive industries to help ensure the nation's future economic competitiveness.

To address these complex objectives, many envision one comprehensive system that is not bound by the age of those served or the type of institutional provider. The interviews with state officials and focus group discussions identified key features of this system. The system would be based on the competencies program participants attain rather than the time they spend in the program. It would be based on high expectations and cover training at all levels within the public and private delivery systems. Other functions of the system include information exchange, program accreditation, curriculum development, instructor certification, individual skill assessment and certification, and labor market exchange. The system would have the capacity for continuous upgrading of skills and quality improvement and would allow for diversity among industries as well as among states.

Building one system will require going beyond setting standards for school-to-work programs, which primarily exist today, to including programs for upgrading the skills of the entire workforce. It also will require that skill standards be defined in new ways by looking at skills holistically within the context of occupational performance for broader clusters of occupations within an industry or across industries.

This concept of skill standards differs significantly from the job-related task list systems that describe a narrow occupation in isolation from its place within the industry.

First, the fundamental unit for establishing standards is the job responsibility or duty, not the individual task or skill competency. The emphasis is on holistic performance that integrates skills and tasks. Such performance can be demonstrated through performance-based assessment and project-based portfolios. Second, this approach requires the full specification of proficiency and mastery levels for the duty performance as well as the competency levels for the key academic, technical, and employability skill building blocks. Third, this approach involves the concept of certification levels within broad occupational classifications that are organized into an industry-based career structure.

To serve the multiple purposes for which they are being developed, standards should be conceived as a continuum of progressive achievement levels, not discrete cutoff points. Basic levels would have more commonality across occupational groups, but higher levels would be more specialized. The continuum should be benchmarked to entry-level skill requirements common to most current workplaces as well as to the advanced skill requirements in the most competitive firms worldwide. The top level of the continuum would be benchmarked to the highest level of performance in that industry or occupational grouping, thereby incorporating the principle of continuous improvement in the system. Defining standards in terms of a continuum of achievement also recognizes the diversity of workplaces and therefore makes it possible to relate skill certification directly to the demands of a specific workplace—a necessary condition to meet the legal requirements of work-related assessment.

The continuum also makes it possible to connect a work-based skill certification system to education-based assessment and certification systems. For example, the basic skill certification level would be associated with the certificate of advanced mastery. This certificate would attest to the achievement of technical and advanced academic skills within the context of a specific industry or occupational grouping. In contrast, the certificate of initial mastery would attest to the achievement of foundation academic and work readiness skills that have been performed within any academic or work-related context.

National Role

There was general agreement among the survey states that a national effort to develop standards and credentials should be an integral part of an overall strategy to improve the quality of both public and private sector investment in education and training. Several people interviewed suggested that the most important contribution a national effort could make is to promote a change in attitude among employers, workers, parents, and students regarding the value of sub-baccalaureate education and credentials. This is tied to the need to create awareness among these groups of how the work that is performed must change and how education must change to better prepare people for the challenges of a changing workplace. They suggested the need for a national outreach campaign to get workers and employers involved in the development and subsequent use of skill standards for hiring and promotion purposes and to guide company training investments. Skill standards cannot be a lever for change unless there is a consensus to move forward. Several respondents suggested that government has to provide leadership to move forward in developing skill standards because business will not do it on its own.

Those interviewed also said that a national system of skill standards is needed to avoid duplication of effort, share costs, and ensure the portability of credentials that will be awarded. In addition, there is a need for a common language, criteria to ensure the quality and integrity of the assessment and certification processes, and national ground rules for how to organize standards and define industries and occupations. Without such a common structure, there is a danger that the various national, state, and industry initiatives now underway will develop in different directions and become entrenched in their respective approaches. Survey respondents suggested that issues such as those raised throughout this report must be addressed collectively.

The survey states also suggested that a national effort is needed to accelerate the standard-setting process because state initiatives often are duplicative, too costly for states to maintain on their own, and too limited to accomplish the necessary task within a reasonable timeframe. Several of the states have stopped skill standards development because it is too costly or because they are concerned that developments at the national level might differ too greatly from state efforts. Respondents strongly suggested that beginning with the design phase, provisions must be in place to sustain the system over the long term. These provisions include enhancing industries' capacity to carry out their significant responsibilities, offering technical assistance to states, and providing in-service training to assist with implementation.

However, the state respondents said that the national effort should build on the significant body of work already underway in the states. Moreover, a single national model should not be imposed on states.

A consensus also is emerging on the need for an independent national board that would create the policy framework for a system of skill standards. This board would be broadly representative of all the key players but draw a majority of its membership from the private sector, including industry and organized labor. Other board responsibilities would include:

- establishing the criteria for setting, validating, disseminating, and updating skill standards by working through recognized industry groups;
- defining a common language for use throughout the system;
- establishing a clearinghouse and dissemination process for informing the system on progress and best practices; and
- creating incentives for industry, organized labor, states, and training providers to participate.

The structure of the board would include advisory groups of experts and stakeholders from participating sectors, including states, to assist the board in carrying out its responsibilities. The actual work of developing standards would be carried out by technical committees established by the board. These committees would be made up of industry representatives, including labor and management.

Private Sector Leadership

There was strong agreement that business and industry and organized labor must be key players—at all levels—if a national system is to succeed. Business and industry should have a primary role in developing the skill standards and credentials. They already have made a significant investment in skill standards through various trade associations and apprenticeship programs and they are best positioned to play an independent, third-party role in the assessment and certification processes. The challenge is how to secure their participation up front and how to ensure that they will be users of the system in their training, hiring, and promotion practices.

State Implementation Role

Many of the survey respondents agreed that the primary state role in a voluntary national system of skill standards and certification should be to incorporate the standards in state education reform and workforce development policies and infuse them into program and curriculum design, performance measures, and occupational licensing and regulation processes. A key state role is harmonizing industry-based skill standards and school-based education standards to ensure that youth are adequately prepared to enter the world of work and continue their education at the postsecondary level. Similar agreement on the use of skill standards is needed among public and private sector training providers to facilitate credit transfer and portability of credentials. State human resource investment councils, where they exist, can play a critical role in helping negotiate such agreements.

Several state officials and focus group members believe that the education community needs to be involved throughout the standard-setting process to ensure that it has a clear understanding of the standards. This understanding will help in designing instructional programs, developing curriculum, and defining appropriate assessment approaches.

States could have responsibility for ensuring the integrity of the system by certifying entities that may award credentials based on the achievement of the knowledge and skills specified in the standards and by promoting continuous improvement in the quality of programs. It also has been suggested that states should work with local industries and education agencies to identify and develop skill standards in areas that have not been addressed nationally, using an agreed-upon format and structure. States could provide ongoing or periodic feedback to the national board on whether the standards reflect reality within local labor markets. In addition, Governors and top state officials could play a key role in promoting and recognizing the participation of local businesses and education and training organizations in the implementation and application of skill standards.

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Appendixes

Appendix A: Phone Survey Summaries

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Arizona

In 1981, the Arizona legislature mandated the creation of skill competencies for the state's vocational-technical education programs. Competencies have been developed and validated for seventy of these programs and have been used primarily in curriculum development. The Vocational Education Division of the Department of Education currently is focused on updating the existing competency lists for its priority programs; priority is based on projected labor market demand. The department also is involved in implementing the National Institute for Automotive Service Excellence standards.

With the passage of the 1990 Perkins legislation, significant effort has been devoted to developing and implementing performance outcome standards for vocational-technical programs. The Vocational Education Division has been the driving force in the design and implementation of these standards.

The responsibility for setting the competencies and standards rests with state educators. The state employs occupational analysts, curriculum and testing specialists, and computer-based management system specialists to work on competency development and maintenance. The competencies are organized by both industry and occupational clusters. The competencies are derived from V-TECS duty/task lists and then validated by state-identified incumbent supervisors and workers from the industry or occupation.

Although there are various forms of student performance assessment in every local elementary and secondary school district, there is no statewide occupational competency assessment. Local districts are using paper-and- pencil tests, performance-based assessment, and instructor assessment to determine student achievement. Final decisions on assessment are made by local administrators and instructors.

The strength of local control and the move to site-based management were cited as factors that are impeding the implementation of uniform standards across all school districts. To address this problem, the state is taking a stronger leadership role in establishing Perkins Act performance measures. The Department of Education also is considering whether to recommend to the State Board of Education a policy that would link competencies to state funding for local programs.

Consistency of definitions and development and implementation processes are considered a must for developing a national system. The new system also must have "high utility" and low implementation and maintenance costs. High utility means that students are being hired, are being promoted more quickly, or are being better prepared for their next educational step as a result of instituting the standards. It is crucial that employers support the standards and demonstrate their support by giving preference to credentialed individuals. As one respondent said, "So what [if we have voluntary national standards] unless they are the right of entry for a particular industry."

Arkansas

Arkansas is just beginning to develop skill standards and credentials. The state is very interested in moving ahead, but education officials are struggling to do so in a tight fiscal environment.

To date, the focus has been on program accreditation—working with trade associations to certify vocational education programs at both the secondary and postsecondary levels. Two programs have been certified so far: automotive repair and building trades. Arkansas hopes to get all of its vocational programs certified by industry associations in the future, with printing the next probable target. In a related action, the state has implemented a high school computer curriculum that was recommended and developed by the Data Processing Management Association.

A second arena in which officials will address the issue of skill credentialing is the state's youth apprenticeship program. Implementation at six pilot sites has just begun, and the credentialing component has yet to be developed.

Education reform initiatives underway in Arkansas are likely to provide further impetus to the use of skill standards and credentials. The State Board of Education has recommended abolishing the general track for high school students, and the state is moving toward implementation of a two-path (college and technical preparation) system. Reform legislation to support a dual system of academic and technical preparation already has been enacted.

Arkansas has a statewide system of student competency testing with eighty-two criterion-referenced test item banks that are correlated to secondary/postsecondary course syllabi. All institutions receiving federal Perkins Act funds will be required to participate in assessing the job-based standards of performance beginning July 1993.

The state official participating in the survey indicated that national standards "are a great idea." Although such standards will be very beneficial to state planners, the respondent thought that they should be developed at the national level because states lack the resources to undertake skill standards development on their own.

Another recommendation was that national planners take into consideration the implementation assistance that states and communities will need to use industry-based standards. Moreover, the official suggested that expertise be developed and shared nationally to help with implementation and in-service training.

Finally, it was urged that standards be developed comprehensively; they should reflect the totality of the industry, not task-based components. The standards should be designed to incorporate the breadth and flexibility workers will need in high-skill jobs.

California

California has been in the business of developing industry standards for about eighteen months. Technological innovations and changes in the state's economy have brought issues of workforce readiness to the forefront. A 100-person task force was organized to examine high schools. In its recent report to the state superintendent of schools, *Second to None*, the task force noted that the needs of business and industry were not being met by the state's high schools. The task force also articulated a vision for restructuring schools, which has given rise to the work now underway in skill standards development.

To improve the skill levels of graduates of both secondary and community college institutions, the state superintendent of schools, the Department of Education, the chancellor of the community colleges, the director of the Department of Employment Development, the Industry Education Council of California, the state Chamber of Commerce, and the California Business Roundtable are collaborating on a joint initiative called "Workforce California." The effort is still in the early stages of development, though business and industry are playing a primary role. Underlying policies and developmental processes are being developed.

Two levels of planning and implementation are envisioned. For each occupational area, an Industry Policy Council will be formed to establish industry skill standards. Regional collaboratives also will be created around the state to define what occupational areas will be covered by the schools in the area. Initially, four occupational areas are being targeted: health care, graphic arts, banking and finance, and telecommunications.

About $1 million has been allocated for development of the initiative. Funds are coming from the Business Roundtable, the state Department of Education Perkins Act allocation, the JTPA 8 percent setaside, and the Office of the Chancellor of Community Colleges. Two federal grants also will provide assistance in specific occupational areas.

Assessment and certification processes have not yet been developed, though it is expected that they will be developed through the cooperative efforts of the schools and the business community. Some field testing of the tools that have been created based on vocational education standards is occurring. From these field tests, California hopes to learn what may be transferrable for purposes of a statewide multilevel application.

Issues related to the maintenance and management of the system have not yet been fully addressed. The state hopes that if the system is designed to be responsive to the needs of business and industry, it will be fully utilized and partially supported by them.

Florida

The development of the Florida skills standard system began five years ago when employers, primarily in the electronics industry, criticized the state's education system for not producing a sufficient number of competent workers. Employers often were forced to go outside of Florida to bring in qualified workers at considerable expense.

In response to this criticism, the state Department of Education initiated a process for involving employers in defining competencies required for workers, first to succeed in entry-level jobs and then to advance to higher level jobs. The department did not set out to develop credentialing standards for a particular type of worker. Its goal was to develop program standards for use in program and curriculum development.

The decision to develop program standards was based on the rationale that most programs train people for several occupations within an occupational cluster and that within the cluster are core competencies people must learn in order to be proficient in any occupation within the cluster. The department sought to identify these core competencies and to design programs and curriculum that would result in students achieving these competencies.

The process of developing competency standards starts with the identification of state-of-the-art competencies from various sources such as V-TECS and lists borrowed from other states. A task force of incumbent workers and technically competent managers from the industry then studies these materials and identifies a core set of program competencies for a specific occupational cluster. Based on these competencies, programs are developed and training system specifications are determined. These specifications are used to purchase training system packages from vendors. The training systems are piloted in various locations in the state before they are implemented statewide. Following the pilots, an evaluation team, made up of industry representatives, conducts an on-site evaluation and issues a report. Evaluation continues as part of an annual process to update the competencies.

The department has program competencies for electronics, automotive technologies, automotive collision, and culinary arts that are required statewide. The competencies drive program design and curriculum development in secondary vocational education programs and programs at thirty-nine area vocational centers and community colleges. Courses taken at secondary schools articulate fully to postsecondary institutions.

Although the system does not include a worker certification and credentialing process, Florida has instituted a statewide transmittal document. Called a "Career Map," the document provides program completers with a record of the competencies they have mastered and how well they did. As each course is completed, the information is recorded. All receiving schools accept the Career Map, and employers use it like a resume.

State education officials have encountered some resistance from instructors during the system's development, but this has not been a major barrier. A greater challenge has been deciding which programs will be a priority given limited resources.

Georgia

The development of Georgia's industry certification system began over five years ago, in part to respond to several national reports that criticized the education system for failing to meet employers' needs for skilled workers and in part to respond to similar criticism from local employers. The state asked the business community what it wanted and needed from the education system. What emerged is a voluntary industry certification system that is based in the secondary education system and carried over to postsecondary technical institutions. The system's primary purpose is to provide quality programs to meet the needs of employers.

The effort was initiated by the state education agencies but involved employers and industry associations as key partners. The state education agencies have worked closely with industry associations, including the National Institute for Automotive Service Excellence (ASE), the Associated General Contractors (AGC), and the Printing Industries of America (PIA), because these groups provide broad coverage of employers within their industry. Organized labor has been involved primarily in the process of verifying the skill competencies required in specific occupational areas. At this point, there has been very little involvement by other government agencies. Employers and industry associations will continue their role of identifying program-specific outcomes and certifying that programs meet the nine categories of standards that have been established.

The general program standards evolved from work with PIA, which set up the print education program. The nine categories of standards relate to the following:

- the purpose and goal for the occupational area, which must be stated clearly;
- administration, including advisory committees, federal relations, written policies, certification processes, and instructional activities;
- learning resources, such as multimedia activities, periodicals, student materials, and libraries;
- fiscal resources to support the program;
- student services, including counseling, placement, follow-up procedures, and legal requirements;
- instruction, which covers the program plan, the student training plan, the curriculum, personal standards, work habits, student progress, ethics-related instruction, testing, evaluation, and applied learning;
- equipment requirements for the program;
- facilities appropriate for the program; and
- instructional staff.

These nine categories of standards drive the development process for occupational programs. The process begins when employers and industry associations define the outcomes they expect for a program area. The education staff then develop the specific program standards and each component of the program. The program is evaluated by an industry team based on the nine categories of standards. If the program meets the standards, it is certified for five years. This process relies heavily on the methods established by V-TECS.

Georgia's industry certification system now covers nine occupational areas, three of which are in the pilot stage. Across the state, there are sixty programs in auto mechanics, thirty in the construction trades, and up to fifteen in graphic arts. Georgia's work in the graphics arts area, undertaken in partnership with PIA, has become a national model that is being used by twenty-nine states. Each occupational area covered by the system includes a set of program standards, a competency-based curriculum, staff development, and student assessment. The state is working to develop credentials in each occupational area that will be validated and accepted by industry.

Georgia has made considerable progress in developing its industry certification system. The state now confronts the challenge of maintaining and expanding the system during a time of limited resources. According to the state official interviewed, in order for the skill standards system to maintain and build credibility with industry, it must continue to keep pace with technological change. This requires an ongoing investment of both public and private resources.

Illinois

Illinois' initiatives to set skills standards are being driven primarily by the Perkins Act performance standards, the need for program improvement, and the student credentialing requirements. Illinois used locally validated task lists, developed in conjunction with other states through V-TECS, as the basis for curriculum development. The Perkins Act requirement that states develop core competencies has caused the state, again in conjunction with V-TECS, to translate these task lists into a more specific and more measurable form for key occupational clusters. Business representatives are in the process of setting skill standards for manufacturing technology, information processing, electronics, food services, and nursing. The state hopes to have industry representatives endorse these measures and standards to make them industry-based skill standards.

Technical committees are working on standards for all occupations except manufacturing technology. This is because the state funded a pilot project to develop standards for manufacturing technology as part of an initiative to develop a youth apprenticeship program in that field. In that project, employers started out with a clean slate instead of relying on existing task lists. Other countries' standards for this field were reviewed to ensure that the standards that are developed are world class. The project, which was carried out in conjunction with the Illinois Manufacturers Association, has resulted in greater private sector ownership of the standards developed.

Illinois also is developing an assessment system at the secondary and postsecondary levels that includes pre-testing and post-testing of program completers to determine competency gains. At the secondary level, the state now is pilot testing the pre-testing and post-testing using a previously developed workplace skills test. Such testing will be implemented statewide next year. Other subjects will follow, focusing first on the occupational areas in which the state has the largest vocational education programs. The workplace skills test is a paper-and-pencil test, but the plan is to move to performance-based assessment over time. Recently, Illinois also has become one of eight charter states involved with Work Keys, which is under development by the American College Testing Service. That effort will involve piloting assessment materials in a variety of areas by applying them to problemsolving situations.

In September 1992, the state legislature enacted the Occupational Skills Standards Act. As part of this legislation, it created a nine-member Standards and Credentialing Council to advise the State Board of Education on the development of standards and credentialing systems. The council is composed of representatives from business, industry, and labor. Its primary responsibilities are to identify occupations for the development of standards and to verify nationally developed standards. The legislation directs the State Board of Education, in conjunction with business, labor, industry, and other state agencies, to establish statewide academic, technical, and general employability skill standards for training occupations; establish a credentialing system for certifying individuals' skills against these standards; publish these standards; and promote the voluntary use of standards and credentialing systems in training programs.

The development of these standards will be coordinated with efforts in other states and national efforts to avoid duplication and promote consistency among states.

Indiana

In 1991, the Governor of Indiana created by executive order a new Department for Workforce that combined the Department of Employment and Training, the Office of Workforce Literacy, and the Commission on Vocational and Technical Education. The intent was to provide for Indiana schools a new focus on workplace skills and career development by consolidating the vocational technical systems, and to promote greater involvement by business, industry, and labor in planning workforce development. Later in 1992, a Workforce Proficiency Panel, composed of representatives of state agencies, business, and organized labor, was created by legislation to oversee the development of technical proficiencies and technical field certificates of achievement for secondary and postsecondary schools.

The development of skill standards is the primary responsibility of the Workforce Proficiency Panel. It is one facet of the agenda of the Department of Workforce Development.

The state goal for the skill standards initiative is to provide quality programs to prepare people for quality employment. The standards will provide a basis for improvement in both secondary and postsecondary schools. Governmental agencies, educational agencies, and the business, industry, and labor communities will be involved in the establishment of standards.

As the starting point for skill standards development, Indiana is focusing on the occupational areas of automotive services and health care. The planning process for setting policies and establishing competencies (proficiencies), as well as the processes for assessment, certification, and program accreditation, are ongoing. Entry-level workers and students in school-to-work transition are being targeted by this initiative. Standards will be organized by job task and workplace competencies and occupational clusters. They will be developed using an industry validation model. Industry and labor ultimately will be responsible for setting the standards. Management of the system will fall under the jurisdiction of the Department of Workforce Development.

Indiana has identified several barriers and constituent concerns that are central to developing a system of skill standards. One difficulty is identifying the appropriate mix of industry representatives in order to ensure the broadest validation of standards. Other concerns are making sure that standards are used to screen workers into rather than out of a training system or job and that there are sufficient resources available. These issues have been a focus of the state's policy and planning discussions. In studying these issues, Indiana officials found very little cataloged research on the development of skill standards. They suggested that this might be an appropriate role for federal agencies as they consider a national system of skill standards.

Iowa

The development of the Iowa system of skill standards was prompted by a 1988 legislative study that raised concerns about the quality of occupational training programs in the secondary and postsecondary education systems. Based on the results of that study, the Iowa legislature enacted a law mandating a minimum set of standards and requirements for educational programs by July 1, 1992. This led the state Department of Education to initiate a process for developing minimum competencies for all occupational programs provided through the elementary and secondary school and community college systems.

To identify minimum competencies, Iowa adopted a modified version of the DACUM process. The process involved forming twenty-eight technical committees structured around occupational clusters. Committee members included incumbent workers and supervisors who were selected with the assistance of labor organizations and industry associations. These committees, working with existing competency lists gathered from a variety of sources, identified a set of minimum competencies for each occupational area. They also identified competencies needed to advance within an occupation. These competencies then were reviewed by local advisory committees and instructors from secondary and postsecondary educational agencies. After a final review by the technical committees, the Department of Education reviewed and approved the competencies and issued them as rules to the secondary education and community college systems. The entire process took just over a year and was financed with Perkins Act funds along with the in-kind contributions by industry of workers' and supervisors' time.

The competencies are scheduled to be evaluated and updated on a three-year revalidation cycle beginning in 1993. The purpose of the revalidation process is to ensure that the state competencies reflect the latest labor needs and technological changes. The statute requires that the structured group process be initiated by the state every five years.

Minimum competencies have been developed in six broad vocational service areas: agriculture education, business and office education, home economics education, health occupations, industrial education, and marketing education. These six broad areas cover approximately fifty-four occupational areas within the secondary education system and 135 occupational areas within the community college system. As of July 1, 1992, the state statute requires secondary occupational programs to articulate with community college programs; at least one articulation must be available for each program area.

Iowa does not have a standardized statewide assessment process. The state statute requires performance-based assessments, but this responsibility rests with the local educational agencies. Generally, the assessment process involves students demonstrating competencies in an occupational area and the instructor evaluating their performance. Paper-and-pencil tests also are used, but primarily by the industries that certify skills for a specific occupational area.

Iowa does not have a worker skill certification process. It encourages the use of national industry standard and certification processes where they are available. All programs are encouraged to develop performance profiles for each student based on the assessments, but the practice has not been adopted across the state.

Although the development of the Iowa system has been driven by legislation, the primary purpose has been to improve the quality of programs. These improvements are designed to build a stronger relationship between what the students are taught and what is required by industry. Moreover, by defining competencies, students are more aware of job requirements and therefore can make better career choices.

In the process of developing the system Iowa faced several issues, such as a lack of consistency and uniformity in standards across industries. This created some difficulty in reaching agreement on a minimum set of competencies. Related to this was the difficulty in getting agreement between labor and management. Another ongoing issue is limited state and local budgets to initiate, maintain, and update the system.

It was suggested that resources be dedicated at the national level to build a national system that involves industry and is supported by industry. States can then become users of this system. In building the national system, resources must be planned for up front to continually maintain and update the system in order to ensure the ongoing support of industry.

Kentucky

In 1990, the Kentucky General Assembly created a Cabinet for Workforce Development to coordinate, improve, and integrate state-supported adult basic education and job training programs, and to make government, business, and labor aware of the need to cooperate in addressing the current and future skill needs of the workforce in the state.

Prior to this action, research on Kentucky's workforce and changes in its economy and workplace indicated that the state needed a better system to prepare workers for the future. Too little attention was given to the availability and quality of adult education, job training, and retraining services. State officials concluded that it was essential for the commonwealth to place a higher priority on developing a technical and adult education system that prepares people for work and on enhancing the technical and academic skills of those already in the workforce.

The Cabinet for Workforce Development outlined a Strategic Plan for Developing a Competitive Workforce. The plan, a blueprint for improving services to all Kentuckians, establishes standards and measures for the state's adult education, training, and retraining programs.

Kentucky is committed to following industrial and curriculum standards in its workforce preparation programs. The Kentucky Tech System, the state-operated secondary and postsecondary training delivery system, has implemented automobile mechanic standards that were developed by the National Institute for Automotive Service Excellence. Standards are now being developed in diesel mechanics and auto body. To assess skills in these occupational areas, paper-and-pencil tests are being used and performance-based assessments are being pilot tested. The state also is developing a certification program for its refrigerant recovery program that will train incumbent workers. Kentucky intends to develop program standards and certification for other occupational areas.

The Kentucky Department for Adult and Technical Education implemented a standardized curriculum for all postsecondary programs in the Kentucky Tech System in January 1993. The curriculum was first piloted in five locations in 1990, and five additional sites were added the following year. It is segmented into individual courses and tasks that:

- create greater program accessibility;
- provide school-to-school consistency;
- increase curriculum delivery efficiency and quality;
- serve more part-time and industry students;
- allow greater scheduling flexibility;
- enhance transferability; and
- more clearly define program content to the public.

Standards of quality are maintained in diploma programs through a comprehensive end-of-course testing called the "Kentucky Achievement Test." This task list-based and industry-validated curriculum has a proven track record of providing a direct response to the needs of Kentucky business and industry.

With the postsecondary curriculum in place, Kentucky was one of the first states to develop and implement a guarantee to employers that graduates of a Kentucky Tech System diploma-level program are competent in the skills for which they have been trained. Each program included in the guarantee has a list of skills that have been industry-validated. These lists of skills—called "task lists"—serve as the foundation for the guarantee, which is offered by all seventeen postsecondary state vocational-technical schools and five health occupations centers.

The Kentucky Tech System also has established fourteen Career Connections Assessment Centers located throughout the state. These centers offer testing packages that can be used for evaluating job applicants, selecting employees for promotional consideration, and developing training programs with individual companies. The centers provide a systematic process to identify an individual's potential by using a combination of hands-on, paper-and-pencil, and computerized assessment resources.

Kentucky also has a pre-apprenticeship program that is registered with the Kentucky Labor Cabinet's Division of Employment Standards and Mediation in cooperation with the U.S. Labor Department's Bureau of Apprenticeship and Training. The pre-apprenticeship program is a technical-preparation/college-parallel curriculum that guides participants to high-skill/high-pay career paths. It applies to occupations that do not require a college degree but that nevertheless require a high degree of technical knowledge and demonstrated skills. The program allows students to earn money as they acquire new occupational skills and it is designed to allow for multiple exit points.

Kentucky was an early leader among the states in developing standards and measures for its adult education, training, and retraining programs. State officials are committed to expanding these programs and to implementing national skill standards as they are developed.

Maine

The skill standards system in Maine is focused on establishing core competencies for its secondary vocational education programs. The system has evolved over a number of years from a local school-based process to one that is coordinated through the state Department of Education, yet implemented at the discretion of local school districts. Approximately four years ago, a decision was made to revitalize and publicize this process in order to increase the involvement and support of the private sector. This decision was driven by the education reform movement at the national level and by the need to upgrade the process to ensure higher quality standards.

The Maine system of skill standards is a series of core competencies for clusters of occupations or, in some cases, specific occupations. The competencies are identified by applying the full DACUM process starting with job task lists, which are identified by committees of incumbent workers for each occupational cluster. These committees complete their work by validating a list of core competencies that are translated into measurable learning objectives by a statewide group of instructors. The learning objectives provide the basis for developing curriculum and assessing student performance.

The key partners in this process are the Department of Education, employers, industry associations, organized labor, and local educational agencies. The Department of Education coordinates the process, works with the industry and labor organizations to identify and select incumbent workers to serve on the worker committees, and facilitates the work of the committees. Once competencies lists are completed, the department works with the local educational agencies in translating these lists into a curriculum.

Maine has core competencies for thirty-two occupational areas within the secondary vocational education system. The process of developing competencies and curriculum takes up to one year and is scheduled to be repeated at least every five years. The cost of this process is approximately $20,000 for each occupational area. Federal Perkins Act funds and a limited amount of state, local, and private foundation funds have been used to underwrite the initiative.

Maine does not have a statewide assessment and certification process that is tied to the achievement of the core competencies. Decisions regarding assessment are made in each school district as part of its program development and review processes. Instructors play an integral role in evaluating students' performance and assessing the degree to which they have achieved the core competencies in a given occupation. In response to the Perkins Act reauthorization, the Department of Education developed and distributed a format for pre-testing and post-testing of competencies. Local schools can adopt this format at their discretion.

Certification of core competencies is in place only for licensed occupations and it is administered by the licensing agencies independently of the schools. A number of schools are issuing certificates of competencies that identify the core competencies a student must achieve in each course. Although the Department of Education is supportive of this effort, there are no plans to adopt it statewide.

In their efforts to revitalize Maine's approach to establishing core competencies, state officials encountered some difficulty in implementing the competencies statewide because of local control of the state's school systems. Consequently, the quality and application of the core competencies differ significantly across the state. Also, because of changes in the allocation of Perkins Act funds that have reduced state funds, system maintenance depends largely on the willingness of local vocational education directors to support the effort through their program budgets. All of these factors limit the state's flexibility to develop and implement a comprehensive system of skill standards and credentials.

New Jersey

The New Jersey initiative to establish skill standards and credentials is part of the Occupational Competencies Project, which was initiated by the New Jersey Panel of Secondary Vocational Education in October 1989. The project fits into a broader framework of developing an integrated workforce development system, initiated by the creation of the State Employment and Training Commission (SETC) through legislation enacted in December 1989. The commission was required to develop a unified workforce readiness plan that would bridge education and training programs administered by the departments of Education, Higher Education, Labor and Commerce, Community Affairs, and Human Services. Included in this mandate was the charge to identify competencies for specific jobs. In carrying out this charge, the commission has become directly involved in the Occupational Competencies Project.

The primary purpose of the project is to identify and verify competency lists to drive curriculum development for occupational training in secondary vocational education programs. The Office of Vocational Education within the New Jersey Department of Education is leading the project and is working closely with other governmental agencies, local educational agencies, employer and trade associations, and worker organizations.

The skill standards will be defined as "core proficiencies" or "competency standards" and will cover secondary vocational education programs that prepare students for entry-level jobs in a variety of occupations. Competency lists have been developed for up to 100 occupational areas, ranging from carpentry to secretarial. Once these are finalized, they will be disseminated to local schools and incorporated into program design and curriculum development.

The process being used to build the competency standards is a modified DACUM method. Technical committees are formed to create lists of duties and tasks, which then are passed on to an educator review panel. The lists ultimately must be approved by the technical committee.

Assessment of student competencies in New Jersey is embedded in the occupational training programs and is primarily instructor-driven. Various types of approaches are used, including paper-and-pencil tests, performance-based assessments, and instructor assessments. Usually, a combination of approaches is applied. Recently, the State Employment and Training Commission recommended that all students completing coursework in an occupational area be assessed externally based on the competencies validated for that area.

Certification of individual skill competencies in New Jersey's occupational programs is tied to state licensure laws for specific occupations or is provided through industry trade associations such as the National Institute for Automotive Service Excellence. Programs in food services and health care have external exit tests leading to certification, though most of these require on-the-job experience beyond high school.

The development of competency standards in New Jersey is hampered by a lack of resources, which has impeded the timely development of occupational competency lists. The process is very staff-intensive, requiring competent individuals to work closely with industry representatives and local educational agencies over an extended period in order to develop and validate accurate, up-to-date competency standards.

The state officials participating in the survey strongly recommended that the national effort to develop a system of skill standards include a standardized format to guide development across states. Without this type of guidance, there will be no consistency in the standards and credentials developed and therefore no reciprocity across states. They also recommended that states play an active role in the development of the national system. Ultimately, they advocate a system that is outcome-based, not process-based, because it is "what the students can do, not how many desks there are in the classroom, that really counts."

New York

New York's New Compact for Learning, the state's education reform initiative, required the state to set standards for the elementary and secondary school systems. A Curriculum and Assessment Council, composed of educators and business and labor representatives, was established to determine what these standards should be. To date, the council has concentrated mostly on developing standards for academic skills. Only recently has it begun work on standards for workforce preparation skills.

Following publication of a report by the Career Pathways Task Force in the summer of 1992, the development of standards for workforce preparation has received more attention. The task force recommended that the Curriculum and Assessment Council incorporate workforce readiness and cross-cutting foundation skills as part of the elementary and secondary school standards. The Board of Regents is considering incorporating work readiness skills into a basic system of standards and assessments that would apply to the elementary and secondary school systems.

The Career Pathways Task Force also recommended that a system be developed to certify technical skills. The Curriculum and Assessment Council has established a Subcommittee on Occupational and Technical Education to study this issue. However, the Board of Regents has been reluctant to proceed with the development of technical skill standards. It hopes the federal government will take the lead in this area because of concerns about cost and credential portability.

Before the debate about certification of technical skills became a major policy issue, the state vocational education system began developing occupational proficiency tests to be given to students at the end of their sequence of courses. These tests were developed at the request of the business community to impart greater credibility to the state's vocational education programs. Paper-and-pencil tests have been developed for the business program and some health care programs. However, vocational education officials have decided not to develop more instruments because of the costs associated with this effort and uncertainty about how broader issues of technical skills assessment will be resolved. In the meantime, existing tests will continue to be used.

Another effort related to skills standards is occurring at the postsecondary level. Each institution that receives Perkins Act funds must develop and submit a plan by spring 1993 explaining how it will develop and set skill standards and how it will assess and document students' attainment of those standards. This plan will be updated each year as part of the annual plan the state is required to submit under the Perkins legislation.

Ohio

The development of the Ohio skill standards system was prompted by state legislation passed in 1988 that called for accelerating the modernization of the state's vocational education programs. In June 1990, the Division of Vocational and Career Education published a paper, "Ohio's Future at Work." The paper, the product of a group of forty-three business, industry, labor, and outside agency representatives, outlined an action plan that resulted in the development and implementation of three major initiatives.

One initiative is the Ohio Competency Analysis Profiles (OCAP), which include performance standards and a list of occupational, academic, and employability competencies for a specific occupational area. The profiles are developed through a process that brings together a committee of industry experts in each of the occupational areas being taught in the Ohio vocational education system. The standards drive program design and curriculum development. A second initiative added to the requirements for completing a course of study outcomes to which both teachers and students would be held accountable. The third initiative is the Career Passport, which is a portfolio containing the formal documents that identify and describe the marketable skills of the student completing a vocational education program. The Career Passport is intended to help students make the transition from school to work and to facilitate their job seeking and career planning.

The system of skill standards and credentials that is evolving in Ohio is defined by the competencies identified in the OCAP for each occupational area. Once the industry experts have defined the occupational competencies, academic skills, and employability skills that make up the OCAP, these are published in a booklet that is distributed to all secondary schools. The schools are required to use the OCAPs in designing their courses of study. Funding for the schools is tied to their use of the OCAPs and the Career Passport.

OCAPs have been developed for seventy-seven occupations within the secondary vocational education system. More than 300,000 adults and 240,000 youth are enrolled in vocational education courses covered by the forty-nine occupational areas. These courses are provided through twenty-nine full service centers that are located within ninety-eight vocational education planning districts throughout Ohio.

Ohio is in the final stages of developing the assessment process for the system. A major feature of the process will be state-validated, pre- and post- competency tests for each OCAP. This component of the system will be implemented in the fall of 1993.

Development of the Ohio system was driven by legislation that sought to modernize vocational education. However, the system's primary purpose is to improve program design and curriculum development to ensure that the state's vocational education programs continue to reflect changes in the workplace and provide secondary and adult students with the necessary skills to enter the occupations of their choice.

State officials continue to face several challenges in implementing the system. Among them is the capacity of local educational agencies to provide quality training that is consistent with the validated competencies. Added to this is resistance on the part of local educational agencies to change. Overall, the greatest challenge is to ensure quality throughout the system.

Oklahoma

Oklahoma has had an extensive program of competency-based curriculum in vocational education since 1968. The Oklahoma Department of Vocational and Technical Education Curriculum and Instructional Materials Center is one of the largest civilian vocational and technical education curriculum development efforts in the United States. The materials are developed using industry committees to identify and validate content for occupations. The instructional materials may be individualized and have a pre- and post-, criterion-referenced test for each unit of instruction.

A duty/task list is developed by each industry committee and provides the framework from which both the instructional materials and the competency tests are developed. In addition, whenever a duty/task list is developed by a nationally recognized trade association or industry, permission is obtained to use it to develop instructional materials and competency tests. The instructional materials and competency tests are both coded so that the academic and workforce preparation skills are identified and integrated into the content.

During the past twelve years, Oklahoma has developed a competency-based testing system for more than 200 occupations. The Perkins Act performance standards requirements place more emphasis on expanding the use of these tests and on involving industry associations to endorse the credentials that will be awarded based on the test results.

Skill standards exist for eight occupations in the construction industry based on standards developed for Oklahoma by the Associated General Contractors. These standards have been incorporated into all programs statewide.

Oklahoma's vocational system also coordinates the certification of seven nurses aide occupations in a joint project with the Oklahoma Department of Health. The nurses aide tests have been incorporated into programs starting in January 1993.

By 1995, vocational programs at the secondary and noncollegiate postsecondary level will be required to test all students using state-developed tests. Written tests will be administered at the completion of occupational instruction. Performance tests will be administered during the course of the program. At the collegiate level, the American College Testing Service's basic skills test will be used for pre-testing and post-testing of academic skills, along with the appropriate test for occupational skills.

By the 1994-95 school year, all programs will be required to occupationally certify individual program graduates.

Oregon

Oregon's comprehensive education reform legislation requires the development of industry-based skill standards. The legislation calls for the development of certificates of initial mastery and advanced certificates pegged to the entry-level requirements in specific occupations, which will be awarded upon completion of the twelfth grade. These certificates will be based on world-class standards. In the long term, the legislation is intended to improve the future competitiveness and productivity of Oregon's economy. The immediate purpose of developing skill standards is to improve the transition from school to work and to make high school curriculum more relevant to labor market needs. These standards will serve as the basis for awarding advanced certificates.

The Department of Education is responsible for developing these skills standards. In the future, the Department of Economic Development will guide the development of skill standards that are relevant to the existing workforce. Both departments work with the Workforce Quality Council, which is responsible for overseeing implementation of the entire system of skill standards.

Recent state experience in developing skill standards suggests that much work is required to persuade employers and delivery systems to support the education reform agenda and focus on developing high-performance work organizations. To date, the state has concentrated its efforts on public outreach, networking, and information gathering, but state officials concede that only a national campaign can completely change the attitudes of skeptical employers and citizens.

Thus far, most of the work has been done by state and local educational agencies, the Department of Economic Development, and individual employers. Trade associations have not been directly involved. The Department of Economic Development, in conjunction with the Workforce Quality Council, has conducted an employer survey to obtain employer input regarding the development of skill standards to guide education reforms. About 4,000 businesses were surveyed by mail and 1,800 responded. Focus groups with employers provided additional feedback. Although many employers said that they had skill standards, most standards were found in heavily regulated industries such as engineering. No standards were found in the service industries.

The state has refocused the mission and expanded the membership of existing vocational education technical committees. These committees are being asked to articulate skill standards in industries key to the state's future economic success. Reflecting the occupational mix of Oregon jobs, these committees are building on the content and structure of standards that already exist within apprenticeship programs, V-TEC materials, and industry associations.

State officials have neither planned for the implementation of the certification process nor expanded the skill standards strategy for the existing workforce. However, the concept of certification within the state covers both career entry and more advanced levels.

Additional staff training will be needed to develop and apply the standards. State officials, who consider skill development a priority investment, will redirect resources to support the effort if necessary.

The state also is working on creating a statewide performance-based assessment system for the elementary and secondary school systems. State officials are striving to incorporate individualized education plans into the assessment system and to discover the most effective assessment and portfolio tools for the system. Ten school-based pilot efforts are underway throughout the state to develop assessment models that can be adopted by other sites. These models will be offered as a menu of options from which model sites can select. Oregon also is one of the charter states working with the American College Testing Service in developing a system for assessing workplace competencies.

Pennsylvania

Pennsylvania has been developing workplace competency standards for the past two years as part of its youth apprenticeship demonstration program in metalworking. Under that initiative, participating students experience integrated academics in the classroom and technical learning at work sites. Pennsylvania's need for skill standards emanates from the work-based component of the program: how to measure student achievement of learning acquired at employer work sites.

The Governor initiated the Pennsylvania Youth Apprenticeship Program (PYAP) in 1989 and designated the Department of Commerce as the lead administrative agency. To ensure local ownership and stakeholder participation, the Department of Commerce relied on Industrial Resource Centers (IRCs) to facilitate local and regional efforts. In late 1992, administrative responsibility for the program was shifted to the Department of Education to ensure implementation throughout the commonwealth's public education system. Although overall program leadership and direction continue to be provided at the state level, local and regional decisionmaking and problemsolving through the IRCs remains a primary focus.

To date, the Governor has sought no legislation on PYAP but has requested new state funds for a significant statewide expansion during fiscal 1993-94. PYAP has been funded by federal and foundation grants. The entire initiative, including developing competencies, has entailed a close partnership with employers in the metalworking field. The National Tooling and Machining Association (NTMA) was a partner in launching the youth apprenticeship program and encouraged its local chapters to participate actively. Groups of employers, educators, and government officials guide the project in each region. The initial competencies were approved by employer committees in each region.

Teacher teams, working under the leadership of the Learning Research and Development Center at the University of Pittsburgh, developed proposed competency definitions through cognitive task analysis. Their work was reviewed and modified in each region by the employer panels. The result in each region was a training matrix that defines detailed competencies to be achieved during youth apprenticeships. These are measured by hours of training, similar to the process used in registered apprenticeships.

Assessment will include a combination of a student portfolio of accomplishments, paper-and-pencil tests, performance-based assessment, and on-the-job assessment. The Pennsylvania vision includes strong use of the portfolio, including both in-school and work-based demonstrations of competence.

Planners are working on questions of certification. They are seeking to create levels of certificates for youth apprentices based upon their level of achievement. They intend to have the initial version of certification in place by the end of the 1992-93 school year so that it will cover first-year students. Decisions about who will issue the certificates or what each level will cover have not yet been made.

Program designers want to shift assessment from time-based measures to skill achievement-based ones and are reviewing approaches for doing so. This action is consistent with the overall thrust of education reform in Pennsylvania, which is to move from a time-based curriculum to a system of learning outcomes that identifies what students must know and be able to do.

Pennsylvania has found defining competencies and certification to be "a long, arduous process." State officials would welcome national industry-based standards so that they could focus more on implementation issues and less on the labor-intensive process of standards definition.

Texas

Texas has been involved in the conceptual framing and policy development of industry skill standards since 1991. In that year legislation was proposed to create a Texas Skills Corporation, which would have convened industry groups and associations to establish occupational skill requirements. Although that legislation was never enacted, the state continues to pursue industry-developed standards as part of its Smart Jobs economic development efforts.

The Commerce Department has been responsible for bringing business, industry, and labor together to set standards. The Governor also has appointed a Texas Skills Development Panel (TSDP) to oversee the development of standards.

Various standard-setting methodologies have been developed and analyzed since 1991. A "model" standard-setting exercise, aimed at system analysts and computer operators, was conducted in August 1992. A modified DACUM focus group process, utilizing V-TECS job duty and task materials, provided the point of departure for this exercise.

The Commerce Department concluded that the test model was obsolete and that the process was too expensive. It also concluded that a Texas-specific standards methodology might conflict with national development efforts. These conclusions were shared with TSDP, which was submitting to the Governor its recommendations on next steps for the state.

The panel believed that before a statewide skill standard could be established, employers and members of the education and training community needed exposure to skill standards and certification. It recommended a pilot program to test an existing set of "sufficiently developed" skill standards in a particular labor market. It is too early to draw any conclusions from the pilot program.

Vermont

In 1985, the Vermont legislature gave the state Department of Education the authority to develop core competencies and tasks for technical education programs offered at the secondary school level. The department, working with private sector employers, used 8 percent funds under the Job Training Partnership Act to develop competencies for occupational, academic, and employability skills for all of its programs that were available to students in grades eleven and twelve, primarily through regional technical education centers.

In 1990, the Governor appointed the Commission on Getting Ready for Work to develop recommendations for restructuring the technical education system in the state. This was part of a broader reform of the elementary and secondary school and adult education systems. The commission's recommendations resulted in a study of the governance and program quality issues. Changes in governance were adopted during the last legislative session.

The new law clearly assigns the coordination and leadership of the post-secondary technical education system to the state college system and assigns adult technical education to the regional technical centers that are operated by secondary-level school boards. Program quality issues were incorporated in the development of a blueprint for restructuring vocational technical education in Vermont. The blueprint addresses issues such as integration of academics in technical education; development of optional pathways to program completion (e.g., school-based programs and youth apprenticeships); higher performance expectations; and improved school-to-work transition services and programs.

One of the twelve objectives proposed in the blueprint recommends that each technical education program graduate be required to meet industry standards, which would entitle the individual to a proficiency certificate issued by a state-level workforce development and standards council. The purpose of the industry standards is threefold: to raise student outcomes; to increase portability of credentials across states; and to allow students to pursue a number of paths, including college entry, registered apprenticeships, or both. Specifically, the aim is to create parity between the skills acquired through the traditional technical education and those acquired through the youth apprenticeship track.

The Perkins Act amendments required states to develop performance standards, including measures of student competence. As a result, Vermont has been forced to tighten up its competency and task statements so that they are more measurable.

Since the issuance of the blueprint, the state Department of Education has begun to implement the competencies so that they meet industry certification requirements. A full-time staff person is assigned to this task and is assisted by department curriculum specialists.

As part of a bill on youth apprenticeship, the department has proposed the creation of a workforce development and standards council to ensure the consistency of program and individual skill standards and of certification procedures across occupational clusters. In addition, state-level craft committees, a designation that would replace the technical committees currently in place, would develop the competencies and tasks lists; the entrance, continuation, and completion requirements for each occupational cluster; and the assessment procedures. Assessment would rely on an examination of the individual's portfolio of classroom and work-based experiences. The design also calls for specific admission criteria as recommended by the *America's Choice* report.

The state-level groups would be supplemented by regional councils and would be composed of representatives of the state departments of Education, Employment and Training, Labor and Industry, and Economic Development, as well as industry and labor representatives.

Vermont is adopting nationally developed industry standards for all of its technical education programs. So far, the state has adopted the Associated General Contractors' program, as well as individual performance standards, for construction trades. For auto technicians, the standards developed by the National Automotive Technicians Education Foundation have been adopted.

Vermont also is working on certification standards with the printing industry, hotel/motel trade associations, associations representing the horticulture industry, health services providers, and other groups. If the industry has developed only program certification standards, the state will require the student to demonstrate mastery of the core competencies and tasks developed by the state craft committees. Although performance assessment strategies will be used, the specific measurement process has yet to be developed. A combination of teacher judgments and standardized testing probably will be used.

Although the work on developing skill standards has been limited to secondary-level technical education programs, the state intends to develop standards relevant to postsecondary programs. Those most affected under current pilot programs are high school students; however, adults without a high school diploma are considered secondary students, and adults with a diploma are entitled to admission on a space-available basis. The initiative will therefore affect members of the existing workforce and individuals across age groups.

Wisconsin

In September 1991, the Governor of Wisconsin issued an executive order creating the Executive Cabinet for a Quality Workforce. The cabinet was established to unite the business, labor, education, and human service departments in an effort to create a high-skills strategy for school-to-work programs. The cabinet was created as a coordinating body to establish a policy framework and an implementation strategy for workforce initiatives. Four studies were undertaken by the cabinet to focus the initial agenda. The studies explored youth apprenticeship programs in printing and metalworking, a strategy for career counseling similar to the German model, and an implementation plan for Milwaukee to create countywide youth apprenticeship programs.

The primary purpose of the skill standards initiatives is to provide Wisconsin employers with a more highly skilled, highly trained workforce. The creation of skill standards will provide the foundation for improving curriculum, instructional methodology, program offerings, and facilities for school-to-work programs.

Two specific industries have been targeted for initial development—printing and metalworking. The Printing Industries of America has provided assistance in moving the agenda forward in graphic arts. Within nine months of initiating the standards for the graphic arts program, it was ready to be piloted in secondary schools. Currently, standards are being set and validated for the metalworking occupations.

Assessment and certification of program participants will be the joint responsibility of employers and educational agencies. Current development efforts are targeted at entry-level or "threshold" workers.

The Department of Industry, Labor and Human Relations, with assistance from the Department of Public Instruction, the Youth Apprenticeship Council, and the Board of Vocational, Technical and Adult Education, will maintain and manage the standards.

There are many barriers to the development of the system, not the least of which is the perception on the part of many parents that graduating from a four-year institution is the only positive outcome for a high school student. It will be difficult for local schools to overcome this perception. There also are institutional barriers to implementation inside government, especially among agencies and departments. Questions about the displacement of current workers and the pathways to promotion also have surfaced.

Appendix B: Case Studies

Industry Skill Standards in Georgia: A Program Accreditation Strategy

by Martha Sorensen, Associate, Corporation for a Skilled Workforce, Ann Arbor, Michigan

Introduction

There are several initiatives underway in Georgia related to the development of industry skill standards. In the early 1980s, the State Board of Education, determined to upgrade high school vocational programs, approached state industry for direction and assistance. The result was the creation of industry-certified vocational programs. In 1986, the Board of Technical and Adult Education was created to oversee the state system of two-year, postsecondary schools. As a tool for improvement and reorganization, industry skill standards were developed and applied to more than ninety fields of study. A third initiative is a program conceived by the Southern Regional Education Board (SREB). The SREB vision of *Making High Schools Work* by integrating academic and high-level vocational education is being piloted in Georgia through the Consortium for Restructuring Secondary Schools.[1]

The main focus of all three efforts is standards. Individual school programs receive certification by meeting standards established by industry associations, consortiums, or technical groups. Although the process is somewhat different in the secondary and postsecondary schools, the end result is the same. Both systems have forged a close association with major employers in the state, enabling schools to better prepare students to enter the workforce by providing them with relevant skills.

Partners in Industry Standards

Several organizations have played a role in standards development in Georgia for both the secondary and postsecondary initiatives.

- The Vocational-Technical Education Consortium of States (V-TECS) is an organization of twenty-three states and six federal agencies that is committed to competency-based vocational education. V-TECS' task and performance objectives have been used as a starting point for the development of the Georgia standards.
- The National Institute for Automotive Service Excellence (ASE) was the first association to certify programs in Georgia.
- The Printing Industries of America (PIA) represents some of the 40,000 firms engaged in printing in the United States. PIA offers certification nationally through a program called PrintED, which was developed by the Georgia PIA chapter in cooperation with the Georgia Department of Education.
- The Associated General Contractors (AGC) certifies individual workers using a multilevel approach to ensure they are appropriately trained. In addition, AGC has designed a institutional program accreditation and certification process to improve the skills of entry-level workers.

Improving Secondary Vocational Education Programs

Changes in the Georgia approach to vocational education occurred in response to the many national reports documenting the inability of public schools to meet the needs of the nation's employers, validation of those findings by the state's own business community, and amendments to the Carl D. Perkins Vocational and Applied Technology Education Act.

The Perkins Act specified that by 1992, "measures of learning and competency gains, including progress in the achievement of basic and more advanced academic skills," must be in place statewide. Another Perkins Act requirement is the use of one or more measures of performance that include "competency attainment" or "job or work skill attainment or enhancement, including student progress in achieving occupational skills."[2] To meet these federal mandates, officials of Georgia's Secondary Vocational Instruction Division turned to members of the business community for assistance. Together they set a goal of providing quality programs to meet the needs of employers while providing noncollege-bound students with the knowledge and skills they need to be successful in the workplace.[3] Attainment of this goal has led to a model for vocational program improvement based on industry-defined standards.

Georgia began the process of developing industry standards by working with the National Institute for Automotive Service Excellence, the Printing Industries of America, and the Associated General Contractors. Each of these organizations had identified the need to upgrade the skills of the entry-level worker and was willing to make a commitment to improving high school vocational programs as one way to achieve that outcome. When the state wanted to improve its program offerings in forestry and horticulture, there was no single entity large enough to staff the standards development process. A consortium of three industry associations was created and charged with developing criteria to define the standards.

To date, standards have been developed for vocational education programs in auto mechanics, auto body, construction, graphic arts, forestry, and horticulture. Programs in marketing, education, business education, and home economics are being piloted. The state expects to expand into metalworking, electronics, and health occupations in the next phase. Certified programs are found both in comprehensive high schools and secondary vocational centers.

Standards Development. Georgia has defined nine standards for which specific criteria are established by the industry for occupational areas. To be certified, a program must meet the nine standards. The standards cover program purpose; administrative support, including an industry advisory committee; learning resources; student services; program budget; instruction; equipment; facilities; and staff.

The actual definition of the standards begins at the micro-level of job task identification. Using a V-TECS model, each job in an occupational area is analyzed by incumbent workers, broken down into specific tasks and the skills needed to perform these tasks, and ranked according to importance. The tasks and skills lists are then validated by larger numbers of incumbent workers and industry representatives to reflect current best practice.

The tasks and skills become the basis for the competencies to be mastered by students successfully completing a program. The competencies also supply the foundation for the curriculum, the instructional methodology, and the testing, assessment, and evaluation of student progress.

It generally has taken three to five years to develop standards for each occupational area. Georgia has used a phased approach. The first year is used to develop the competencies. In the second year, facility and equipment needs are identified and the curriculum is developed. Pilot testing occurs in the third year, and the fourth year is used for the certification process, including application and site review. In the fifth year, full implementation occurs. The cost of development has been between $60,000 and $80,000. Some of the associations have contributed funds as well as staff time and expertise.

Standards are established at the state level to provide continuity and consistency in quality across districts, even though individual teachers and school districts seek program certification. Not all certified programs in an occupational area will be the same at every school; there is flexibility regarding the way some of the standards will be met and which specialized fields will be offered. Programs also reflect local community needs and resources. However, all certified programs must meet the minimum industry standards.

Industry Certification. Twenty-five percent of Georgia's vocational education student population is participating in an industry-certified program. Statewide implementation of industry-certified programs has not been mandated by legislation, budget policy, or executive order. However, certification has been used as a tool in school improvement plans statewide, as well as by teachers motivated to provide the best possible courses of study to their students.

The state has made a financial commitment to the program through start-up grants that are available to teachers and schools seeking certification. The grants may be used to upgrade equipment or materials or to provide for staff development or facility improvement. Moreover, several of the associations have made grants or donations of equipment to improve facilities and classrooms for those programs that have sought certification.

The certification process takes approximately one year. Teachers and administrators must prepare the initial application and a self-evaluation and then host an on-site evaluation team from the industry association. Considerable documentation must be presented that adequately describes what facilities and equipment will be available and how the standards will be met. The on-site evaluation is conducted by a team of industry association representatives and educators. Most of the associations charge a fee for certification.

A program certification is valid for sixty months (five years), and several associations monitor compliance at thirty months. If there is a substantial change in a program, such as the departure of an association-certified teacher or a significant change in the budgetary allocation, certification may be suspended or revoked.

In addition to the standards for certification, industry associations have developed curriculums, instructional guides, and assessment and evaluation tools. Some associations require that their material be used, while others accept alternatives that meet the standards.

Neither the schools nor the industry associations assess or test students individually to measure levels of accomplishment as part of the high school program. Portfolios that detail students' mastery of specific competencies are used in all certified programs as an assessment tool, and students can use them as proof of capability when contacting prospective employers. Some associations provide a certificate for completion of an accredited program, while others have association occupational tests that eligible students can take.

Providers operating ASE-certified programs are encouraged to recognize student completion of specific skill areas with a seal or a stamp on the diploma. After two years of work experience, individuals are eligible to take the ASE certifying examination in their specialty areas. Students who graduate from PIA-accredited programs enjoy preferential hiring and may even be able to access financial aid assistance to further their education in the field. AGC certifies individuals through a written exam in three areas. A student completing an accredited program is eligible to take the test, sidestepping the requirement for two years of on-the-job training. However, the actual certification is held for two years while the student gains work experience.

Changing Adult Education

In 1986, the Quality Basic Education Act was enacted by the Georgia General Assembly. The Board of Technical and Adult Education was created to manage the state's two-year postsecondary vocational technical institutions. Appointed by the Governor, the board appoints the commissioner and oversees the Department of Technical and Adult Education (DTAE). The board is charged with establishing a uniform state system of quality institutions that can serve as full partners in the economic growth and development of the state.[4] To accomplish this primary goal, DTAE has used industry standards to make wholesale changes across the state system.

Standards Development. The process of change began with the establishment of a policy framework that would serve as a mechanism for planning and evaluating all adult education programs. The first step was to appoint a standing committee of the DTAE board that would develop uniform standards for institutions and programs throughout the system. The standards developed by this Standards Committee would serve to ensure the quality of delivery, content, and outcomes of programs; provide consistency between programs of similar disciplines; enable transferability; improve articulation to four-year institutions and junior colleges; and enhance credibility in the business community. The second step was to review the existing system to better understand current program offerings, courses, facilities, administrative practices, and the financial strength of each institution.

At the same time, a survey of Georgia businesses was conducted to identify their needs. Using this information, the committee determined that in addition to employability and occupational skills, there was a need for instruction in the basic skills of communication and computation. The committee also advised the board that state-approved minimum institution accreditation standards should be created for every postsecondary technical education program that receives state funds.

Under the direction of the Standards Committee, these recommendations were incorporated into two types of accreditation standards: institutional standards, which are the conditions that an institution must meet to satisfy minimal requirements for accreditation by the regional body and that also meet state requirements for an acceptable institution; and program standards, which govern quantitative and qualitative aspects of programs of study.

For purposes of development, program standards were further subdivided into general program standards and program-specific standards. General program standards provide criteria for structure and quality applicable in all technical programs. Program-specific standards address issues such as program duration; essential competencies; sequence; organization, admission, and completion requirements; equipment facilities; curriculum; instruction; and outcomes.

The Standards Committee assumed responsibility for the development of institutional standards and general program standards. Institutional standards were developed based on the criteria of the Southern Association of Colleges and Schools.

State Technical Committees were appointed by occupational clusters to assist in the definition and development of program-specific standards. Representatives from appropriate trade, professional, or other industry associations or societies; employers in the field; and organized labor were appointed to the State Technical Committees as appropriate. These committees had the primary responsibility of identifying and validating competencies within occupational areas. The committees also worked closely with educators to develop curriculum, facility and equipment requirements, staff development plans, and evaluation and assessment techniques.

Using the V-TECS model, the committees created and validated task lists by occupation. As in the secondary vocational programs, the task lists were used to define the skill competencies that underlie curriculum, instructional methods, and assessment and evaluation. Educators then met with the Technical Committees to review the validated task lists and prepare curriculum, course descriptions, prerequisites, and objectives for the completion of each class.

Ninety fields of study were identified for inclusion in the state system. At the outset, DTAE devised a five-year plan for the development of industry standards for all educational areas. As of 1992, all standards delineated in the plan were developed.

The Technical Committees have remained active in maintaining and updating program content as changes occur in the workplace. The committees make annual recommendations on industry changes that affect program content. Schools are responsible for revising course structure and scheduling to better serve their students.

Using standards as tools, DTAE has been able to markedly change the quality and focus of the state's technical schools. There is no longer a myriad of schools under local control. The twenty-eight schools in the state system are now under the direction of one board. The system is funded by the state, and school personnel are employed as state employees.

This system offers consonant occupational instruction and a core program in math, English, and employability skills. Consistency and commitment to quality has enabled DTAE to establish a student guarantee to ensure employers that graduates of certified technical programs are competent and ready to enter the workforce. If an employer finds that an individual is unable to perform the required job duties, DTAE will re-enroll that individual and provide the necessary training at no cost to the employer or the individual.

Making High Schools Work

In 1987, the Southern Regional Education Board launched a project to change the future of students in both general and vocational programs. In 1992, SREB published *Making High Schools Work*—its vision for a new high school that would take a systems approach to teaching, integrate vocational and academic study, and provide a high-quality education for career-bound students.[5] Officials are working to implement that vision through an initiative known as the "Consortium for Restructuring Secondary Schools."

The goal of the consortium is to "bring general and vocational students' achievement in mathematics, science, and communication to the national average by the year 2000." The consortium intends to fund pilot schools across the state that are willing to make the changes in curriculum, teaching methods, instructional practices, and course offerings necessary to achieve its goal. The state is hoping to find a pilot school in every district. To date, ten schools have been identified as pilot sites; each one has industry-certified programs as its base of available vocational programs.

Issues for Consideration

The system of program certification relies heavily on the enthusiasm and determination of individual teachers to pursue accreditation. Using this approach, the state is assured that the most dynamic and individually motivated teachers have the opportunity to provide the most relevant instruction using current industry practice and equipment. This does not, however, ensure an even quality of programs across the state or equal access to the best programs for all students.

Teachers do not control all of the variables that affect the quality of their programs. They must have the support of the system in the budgeting process to ensure adequate facilities and equipment, and in the counseling process to ensure that students entering the program have the ability to meet the standards. Teachers also need help from administrators in keeping the records and preparing the documentation needed for certification. They also must have time to participate in teacher training.

Students in vocational programs do not always have the academic background to attain the competencies required in the standards. When programs are not well integrated into the academic side of secondary education, vocational instructors spend valuable time teaching basic skills. Moreover, the special needs students frequently enrolled in vocational programs require more instructional assistance than is currently available in most vocational classes.

Currently, there is no mandate for certification in the state school accreditation process or budget process.

Endnotes

1. G. Bottoms, A. Presson, and M. Johnson, *Making High Schools Work* (Atlanta, Ga.: Southern Regional Education Board, 1992) p. 2.
2. Carl D. Perkins Vocational and Applied Technology Education Act 1990, Section 15 (a)(1) and (a)(2).
3. Author interview with William P. Johnson, Director, Secondary Vocational Instruction Division, Georgia Department of Education, November 1992.
4. Author interview with Pat Stonehouse, Director of Instructional Services, Georgia Department of Adult and Technical Education, November 1992.
5. Author interview with Gene Bottoms, Director, Southern Regional Education Board State Vocational Education Consortium, November 1992.

For More Information

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The Pennsylvania Youth Apprenticeship Program: Skill Standards to Support School-to-Work Transitions

by Larry Good, President, Corporation for a Skilled Workforce, Ann Arbor, Michigan

Introduction

Since 1990, a committed group of Pennsylvania employers, state officials, academics, and educators has been laboring to establish a six-site youth apprenticeship pilot project in metalworking. Today, 105 students and 76 employers are participating in the program, now in its first full year of operation.

Designing an entirely new program that marries the best practices in European apprenticeship systems with the realities of American educational and social cultures is a challenge of substantial magnitude. The Pennsylvania team is tackling many difficult issues. One issue is how to measure and credential the competencies achieved by program participants.

Pennsylvania has not yet completely answered all of the questions surrounding skill standards and credentials. As is typical of projects involving systemic change, the Pennsylvania Youth Apprenticeship Program (PYAP) operates with a "just-in-time" developmental methodology. For example, PYEP will need initial competency measures by the end of the 1992-93 school year and thus it is working now to produce them.

The Pennsylvania initiative is useful to study for a number of reasons. First, it is a project designed to meet the skill preparation requirements of a single major industry and occupational cluster—metalworking. Second, it started with a blank slate. Although both employers and educators are stakeholders, they are putting aside their institutional biases and building from the ground up. Third, it is a work in progress. Pennsylvania's efforts can inform states that are interested in tackling comparable questions and contribute to the national dialogue.

History of the Initiative

The Pennsylvania Youth Apprenticeship Program has as its roots an economic development initiative called "Manufacturing Innovation Networks (MAIN)."[1] MAIN, jointly sponsored by the departments of Commerce and Labor and Industry, was established to work closely with organizations representing clusters of smaller firms on issues that could not be addressed successfully by individual firms.

One such collaboration was with the National Tooling and Machining Association (NTMA) on behalf of 250 metalworking companies clustered in the Erie, Philadelphia, Pittsburgh, and York-Lancaster areas. As a result of member surveys, it was decided that workforce quality was the central issue to be addressed, and that creating a program recasting how students prepare to enter skilled technical jobs in the metalworking trades through an apprenticeship framework was the approach to be used.

Pennsylvania, working with consultants from Jobs for the Future and CDS International, wrote a proposal and obtained grants from the U.S. Department of Labor and several foundations to establish a youth apprenticeship program in metalworking. Development of the program began in 1990. As of the fall of 1992, approximately 105 students were enrolled in the program located in four regions: Philadelphia, Pittsburgh, York/Lancaster, and Lycoming County (replacing Erie).

The program, as is typical of youth apprenticeship initiatives, uses the work site as the central focus for student learning and emphasizes an integration of classroom and work-based learning. During the in-school portion of the program, students take courses taught by interdisciplinary teams. These courses integrate the academic material across fields with the real-world practices of the metalworking trade. Each student spends regular time at a work site, learning from mentors the skills required to become a trained machinist or tool-and-die maker.

Defining Youth Apprentice Competencies: An Overview

Pennsylvania's youth apprenticeship stakeholders have had to think through a number of issues relating to the competencies students should be expected to obtain, how to teach them, and how to assess and certify them.

As program planners began to tackle questions of program design and curriculum, they quickly found themselves having to confront what competencies would be expected. PYAP is approaching the question of competencies on several levels.

Expanding upon the U.S. Labor Secretary's Commission on Achieving Necessary Skills (SCANS) framework of foundation skills that students will need to be successful, a set of "enabling skills" has been identified. The analysis of these skills has been done in the context of workplaces designed for automated flexible manufacturing, and schools are being encouraged to ensure that students possess these skills prior to entering work sites.

Technical competencies, based on tasks and measured in hours of instruction/work, have been adopted at each site and are being used in the form of a training matrix for each student. Generally, the competencies have been built around the job of machinist. However, program officials are considering a shift to a holistic approach, using broader definitions of occupation (e.g., manufacturing) and creating skill-based measurement.

Program planners now are creating the initial credentials and are exploring a multilevel system of credentials that would include a certificate of readiness for a technical career, which would be issued in the twelfth grade, and higher level certificates of technical mastery, which would be issued once occupation-specific skills are mastered.

Assessment will be done with a combination of pencil-and-paper and performance measurements, using a student portfolio as a central tool. The portfolio will contain evidence of classroom achievement and technical achievement at work.

Partners' Roles and Responsibilities

The Pennsylvania Youth Apprenticeship Program is being constructed and piloted on a highly decentralized basis. A working premise of the program is that regional variation is real and important to acknowledge, and that encouraging local partners to make the crucial decisions will lead to more successful outcomes. It also is believed that the state can learn from the program variations and then use that information to assist in expanding the initiative statewide.[2]

PYAP is coordinated through regional industrial resource centers (IRCs), which are state-funded manufacturing modernization assistance offices that report to the state's Commerce Department. Each regional PYAP manager is housed at an IRC. Moreover, to receive foundation funds for this initiative, the state program managers must be housed at the York IRC, not in the state capital of Harrisburg.

The overall governance of the program is handled through a partnership among business, education, labor, the community, and government. Each region has a stakeholder group composed of representatives from all sectors. At the state level, a similarly constituted advisory group has been formed.

Decisions about work-based competencies, based upon research and framing done by the University of Pittsburgh, have been made in each region by employer subcommittees of the stakeholder groups. The expected academic outcomes have been driven by educators and members of the business community. The PYAP team has not yet decided who will undertake assessment of apprentice performance or who will certify achievement.

The Standards-Setting Process

To determine the work-based student competencies that would be required, PYAP contracted with the University of Pittsburgh's Learning Research and Development Center (LRDC) to lead the framing of standards setting, curriculum development, and teacher training, among other issues.

Working with LRDC, a team of teachers observed work at a number of metalworking companies to learn the tasks that employees must master in order to be prepared to become a machinist. That information was combined with input from NTMA and from literature searches to construct an initial list of competencies that students should be expected to master in a four-year youth apprenticeship program.

The results of that work were shared with the local stakeholder groups and reviewed by employer subgroups in each region. Based upon their input, the competencies were approved and then used as a basis for constructing a training matrix for guiding student learning. The training plan was built upon four groups of competencies: shop practices, tool room, advanced shop practices, and advanced tool room. A number of specific competencies were defined within each broader competency group.

The training matrix reflects the hours of instruction/work, similar to the approach used in registered apprenticeship programs and many school-based programs. It is being used as a tool to coordinate decisions between schools and employers on what youth apprentices will be expected to do and accomplish during the program.

One important lesson Pennsylvania learned is that employers had neither the time nor the professional training to develop the standards from scratch, and attempts to persuade employers to do so faltered. However, program officials found employers ready and able to react to proposed competencies and requirements.

PYAP leaders want to move from hours-based standards to skill-based standards and currently are debating a proposal that would begin that process. Although they believe that skill-based standards are where they want to go, they began with an hours-based approach largely because of its familiarity to participants, educators, and employers.[3]

Similarly, PYAP leaders want to shift from micro task-based analysis to a holistic approach based upon the breadth of skills required for an employee in a high-performance work setting. Historically, task-based approaches have been constructed to match narrowly defined job titles—a practice they believe is becoming obsolete in an era when an entire plant may have only three or four job classifications. They have begun thinking about how to analyze jobs holistically rather than in disaggregated elements.

Assessment Processes: The Role of Portfolios and Performance Testing

PYAP is still developing its assessment tools and approaches, but it is clear that portfolios will take center stage. Conceptually, program planners subscribe to a strategy of combining assessment approaches, including paper-and-pencil tests, performance-based assessment, and on-the-job assessment. Currently, they are wrestling with two key issues: who will do the assessments and what tools will they use?

Based upon discussions thus far, it is likely that the answer to the "who" question will be students, through self-assessment, school, and employers. Program planners want employers to be integrally involved in the assessment process and are working with them to define how to do so. PYAP supporters are approaching the assessment as an ongoing process of measuring achievement that is best done collaboratively as part of the school and work-based learning activities, not simply as end-of-the-course testing.[4]

To date, the most widely accepted assessment tool is the student portfolio. As envisioned by PYAP stakeholders, the portfolio will combine evidence of academic performance with demonstrations of job-based competencies.

Employers are excited by the prospect of being able to review both a checklist of work-based accomplishments and evidence of specific achievements by students when interviewing them for a job. For example, one employer noted that seeing that the student had mastered a specific machine would provide valuable information about the skill level he or she would bring to the job; the employer could then determine how the student's skills might match with the machinery used at the hiring company.[5]

When the portfolio is envisioned as comprehensively as it is in Pennsylvania, the line between actually being an assessment tool and serving as a form of credential is blurred. When asked about assessment, interviewees invariably started with the portfolio, seeing the building of evidence about achievement within it as the best assessment tool being developed.

At the same time, they saw the portfolio as a powerful credentialing device. Employers who were interviewed saw greater value in a portfolio than they did in a certificate type of credential. According to one employer, measurement is uneven from employer to employer, even in registered apprenticeships; in contrast, a portfolio provides useful nuances about what the candidate is capable of doing.[6]

Substantial energy is being devoted to launching the portfolios, and they appear to be enjoying substantial acceptance among both educators and employers involved in the program. Employers foresee portfolios being used regularly in interviewing and hiring.

The approach currently being tested is to require students to maintain their own portfolios, with employers and teachers periodically reviewing the contents for accuracy and completeness. Among other things, a reviewer would mark off on a checklist the competencies that have been mastered.

Other assessment tools for measuring work-based competency achievement are under development. It is likely that schools will administer paper-and-pencil tests and that employers will be approached to assist with performance-based assessment. PYAP officials want the results of these assessments to become part of the student's portfolio.

Credentialing Plans: Certificates of Readiness and Mastery

PYAP designers are making their initial decisions about credentialing. They confront the need to establish multiple levels of credentials, based upon the flexibility of the program. First, because students may leave the program in any year, some form of yearly progress certification is needed. Second, because students may go on to some form of postsecondary education or directly to employment from the youth apprenticeship, an end-of-program credential that responds to those different markets also is needed.

To meet these needs, the management team has proposed a multilevel system built upon the concept of certificates of mastery. These certificates have been proposed by SCANS and many others in recent years.[7]

The initial level being proposed is a certificate of readiness. The vision is that entry into adult apprenticeships and certificate and associate degree programs would be based upon achievement of this certificate. In essence, it would be a credential indicating that the holder is ready for postsecondary education in technology. It would certify that the holder had mastered the enabling (i.e., foundation) skills as well as defined academic and hands-on generic skills required to succeed in manufacturing.

The certificate of readiness would be issued as being somewhat equivalent to having acquired twelfth-grade skill levels. It would be awarded without a grade but could be endorsed for distinction.

At a higher level, PYAP envisions a series of certificates of mastery of technology. These would certify that the student has:

- completed the PYAP program;
- demonstrated all of the enabling (foundation) skills;

- achieved an appropriate level of academic excellence; and
- demonstrated an appropriate set of occupation-specific skills in a specific trade.

Educators and employers would jointly develop the requirements for the certificate of readiness, and employers would be responsible for defining the occupation-specific requirements of the certificates of mastery. Assessments would be developed jointly by teachers, mentors, and journeymen.

Whether this or another model will emerge is not yet clear. However, it is clear that PYAP managers and stakeholders are very concerned about creating individual credentials that are meaningful to students, postsecondary educators, and employers. The long-term success of the youth apprenticeship model hinges on its ability to demonstrate that the student has achieved the competencies.

Extent of Coverage: The Manufacturing Crafts and Repairs Cluster

The Pennsylvania youth apprenticeship program has focused on metalworking. The program is targeted to the category of machinist/machine technologist, because this category was seen by participating employers as a broad occupational area in which labor shortages were particularly severe.

More recently, PYAP has begun rethinking its targeting strategy and is considering broadening the program to include other job categories. Research shows that more than 80 percent of manufacturing jobs in the year 2000 will require some form of postsecondary education. Moreover, the rapid changes in job content and responsibilities quickly make traditional job task analyses obsolete.

With those considerations in mind, Pennsylvania is rethinking the best use for the eleventh and twelfth grade portion of the youth apprenticeship. The concept under discussion is to broaden the occupational cluster now used to encompass manufacturing, crafts, and repairs. As defined, this cluster would include ninety-two apprenticeable occupations recognized by the U.S. Department of Labor. It would include repairers, mechanics, installers, precision production workers, and craftspersons.[8]

A student completing the first two years of the youth apprenticeship program would be certified in Manufacturing Crafts Repairs (MCR) readiness. From there, the student would have an adequate foundation to progress into any occupation within the cluster for advanced technical training. This model builds on the premise that many skill requirements are consistent across all manufacturing occupations, and that a common, flexible foundation is the most valuable outcome an entering student can obtain.

Pennsylvania officials are considering this approach because they are concerned that students should be "educationally prepared" for an entire career, not "trained" for a specific job.

This concept has important implications for setting standards. It requires a foundation of skill requirements that are generic within very broad groups of occupations, such as the MCR cluster. This approach would lead to the establishment of technical competency benchmarks in a number of technical areas that build upon that foundation.

Relationship to Education

Because it began as a gubernatorial initiative outside the traditional vocational education structure, PYAP initially ran into significant resistance from the education community. Many educators viewed the program as a competitor for turf and students.[9]

As the program has evolved, the relationship between traditional vocational educators and PYAP has warmed considerably. As noted earlier, many youth apprentices now receive their in-school learning at vocational high schools or centers, and some of the program's teachers are vocational education teachers.

The question of how youth apprenticeship and technical preparation (tech prep) will fit together has yet to be resolved. Initiated as part of the federal vocational education funding, tech prep generally is an in-school program that combines high school and community college learning experiences to achieve integrated career preparation outcomes. As one program manager put it, "We're not sure whether youth apprenticeship should be part of tech prep or whether tech prep should be part of youth apprenticeship."[10]

A second and more serious concern is the challenge of linking the program with the elementary and secondary education systems. A frustration frequently cited by vocational teachers and apprenticeship program planners is the difficulty of persuading counselors to encourage good students to enroll in career preparation courses in general, and in youth apprenticeship in particular. Recently, a bus tour of employer sites was held for counselors in one county to increase their awareness of the opportunities for students in modern manufacturing.

There are strong signs that a deeper, richer connection will occur in Pennsylvania between education and youth apprenticeship. First, the state recently adopted a policy to move the elementary and secondary education systems from the "time-at-seat" Carnegie unit model of measurement of student achievement to measures based on outcomes. The implementation of this policy will create substantial opportunities to link general school requirements with the competencies required for employment.

Second, the Governor has established linkages between the departments of Education and Commerce to encourage the adoption of youth apprenticeship across the state.

Issues and Observations

The case in Pennsylvania is not one of a state deciding it wanted to set skill standards and credentials and proceeding with their development. The state created a major new school-to-work initiative and then realized it needed to figure out how to define, measure, and credential competencies.

The development of competencies is difficult and time consuming. Many state officials said that they would be very happy to see national actors take on the development role so that they could focus on using the results.[11] At the same time, program stakeholders are strongly committed to making the youth apprenticeship program succeed in the local communities in which the pilots are operating. They are not inclined to adopt work done elsewhere without first validating it locally. As PYAP

Director Jean Wolfe said, "If national standards are better than what we have, we'll use them. If they aren't, we won't."[12]

PYAP was launched from the context of small manufacturing firms having to meet the demands of global competition, not from the context of traditional vocational education planning. As a result, program planners are focused on the need for flexibility and cross-occupational skills that modern workplaces require. Planners are struggling to think holistically about the skills that are required for broad-based job classifications. They consider task list-based approaches to be connected to the Taylorist low-skill manufacturing model of the past, not to the flexible manufacturing workplace of the future.

Finally, employers have remained deeply committed to PYAP, perhaps because the program was initiated to fill an identified shortage of machinists. The public sector players and participating companies have mutually agreed on the role each should play, and the partnership has resulted in considerable progress.

Endnotes

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2. Author interview with Sharon Wherley, Pennsylvania Youth, Project Coordinator, Apprenticeship Program, November 1992.
3. Author interview with Martin Nahemow, Director of School-to-Work Projects, Learning Research and Development Center, University of Pittsburgh, November 1992.
4. Author discussions with Martin Nahemow, Jean Wolfe, and Robert Coy, November 1992.
5. Author interview with Keith Billet, Billet Tool, York, Pennsylvania, November 1992.
6. Author interviews with James Reed, Keith Billet, Bob Bensing, and Rick Ay, metalworking employers in York County and Lancaster County, Pennsylvania.
7. Martin Nahemow, "Certificate of Readiness in Technology," an unpublished paper prepared for the Pennsylvania Youth Apprenticeship Program, September 1992.
8. Martin Nahemow, "The Common Enabling Skills of Workers in Manufacturing, Crafts, and Repairs," an unpublished paper for the Pennsylvania Youth Apprenticeship Program, September 1992.
9. Kazis, p. 20.
10. Author interview with Jean Wolfe, State Director, Pennsylvania Youth Apprenticeship Program, November 1992.
11. In particular, author discussions with Nahemow, Wolfe, and Coy.
12. Author interview with Wolfe, November 1992.

For More Information

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Developing Industry-Based Skill Standards in Texas

by Jan Urban-Lurain, Associate, Corporation for a Skilled Workforce, Ann Arbor, Michigan

A Plan to Reform Vocational-Technical Education

The roots that anchor Texas' skill standards development initiatives can be traced to education reforms legislated in 1984-85, which required labor market-driven planning for vocational education. In 1987, the Master Plan for Vocational Education and the Report of the Select Committee for Higher Education called for pilot projects to explore the feasibility of regional vocational-technical education planning and recommended partnerships with business to support this planning. In the same year, three state agencies—the Texas Education Agency, the Texas Higher Education Coordinating Board, and the Texas Department of Commerce—formed the Tri-Agency Partnership to support the regional planning efforts. Using federal Job Training Partnership Act (JTPA) and Carl D. Perkins Vocational and Applied Technology Education Act funds, three pilots were launched in 1988 to test integrated, regional, quality workforce planning. Eventually, nine pilot projects received funding.

In 1989, the seventy-first state legislature enacted legislation requiring regional vocational education planning and establishing twenty-four Quality Workforce Planning (QWFP) committees with responsibility for regional vocational-technical education planning. Subsequently, rules were adopted linking vocational-technical education and training to labor market demand, employer needs, and economic development. The QWFP committees were charged with providing a planning forum to "address the needs of employers for a skilled and educated workforce."[1]

In tandem with the creation of the QWFP committees, the state Department of Commerce contracted with the Texas State Occupational Information Coordinating Committee (TSOICC) to create SOCRATES, a labor market analysis software package. SOCRATES provided the QWFP committees access to a statewide labor market information database; this gave them the capacity to generate inventories of key regional industries with the greatest job openings, as well as to target occupations within these industries. In addition to identifying these key occupations, the SOCRATES system gave each QWFP committee information on tasks and duties associated with each occupation—information generated by the Vocational-Technical Education Consortium of States (V-TECS).

SOCRATES represented a significant step forward. It enabled the QWFP committees to develop, display, and disseminate disparate data elements in a clear and usable format. This locally driven, data-driven system provides a vehicle for impacting what is taught in vocational-technical training programs on a statewide basis.

From Labor Market Planning to Skill Standards: The Texas Skills Corporation

During this same period, the Department of Commerce initiated a study with the LBJ School of Public Affairs at the University of Texas to explore the idea of a Texas Skills

Corporation. The intent was for interested businesses and industries to fund and participate in the development and implementation of state-of-the-art curricula for college and secondary schools. It was thought that the corporation could become the impetus for setting skill standards and the vehicle for organizing an industry-based system of skill certification. The corporation was conceived to establish a voluntary system in which industrywide skill standards were set and incorporated into vocational-technical training programs. These training packages then were to be made available for incorporation into local secondary and postsecondary education partnerships through the QWFP committee structure.

In March 1991, the Texas Skills Promotion Act was introduced in the state legislature. The proposed act would have amended the Department of Commerce's enabling legislation to establish a nonprofit Section 501(c)(3) Texas Skills Corporation. It would have charged the corporation with convening industry groups and existing industry associations and setting the skill requirements of occupations found in the Texas workforce. However, this legislation was not adopted, primarily because industry support for the measure was not sufficiently mobilized to ensure its passage.

"New Texas Prosperity" and Skill Standards: The Texas Skills Development Program

Although the Texas Skills Corporation did not come into being, the concept of industry-driven skill standards for education and training continued to survive, now linked directly with the Governor's commitment to high-skill, high-wage jobs and a "New Texas Prosperity."

In October 1991, the Governor delivered a blueprint for the long-term economic well-being of Texas. A key element of the New Texas Prosperity was a Smart Jobs plan, conceived as a comprehensive workforce preparedness strategy for the state, to be developed under the leadership of the State Job Training Coordinating Council (SJTCC).

Subsequently, in February 1992, the Governor charged the Department of Commerce with initiating the Texas Skills Development Program (TSDP) as part of the Smart Jobs plan and New Prosperity agenda for Texas. Once again, the Department of Commerce was given the lead to develop a model, bringing together business, industry, and now labor, to spell out the skill standards for occupations deemed key to Texas' economic future.

TSDP is envisioned by some as "the long-term engine" of the Smart Jobs plan.[2] Others see it as a means for employer validation of technical education curricula.[3] It is envisioned that the program will encompass three broad functions: standards setting, standards distribution and adoption into curriculum, and certification. Consistent with the earlier Texas Skills Corporation concept, the program's stated purpose is to establish "a statewide method to make sure Texas workers have the skills business and industry need to market Texas goods and services in a global economy."[4] The central role for skill standards in achieving this purpose is clearly embedded in the program statement of need:

- Texas cannot develop a world-class workforce without a system of occupational skill standards that are used by education and training institutions and are benchmarked to the highest standards in the world.
- Texas lacks a system, method, and focus that would permit industrywide participation in setting skill standards.
- The current system is fragmented and based on each education or training institution setting locally determined standards without the benefit of information or guidance on the definition of world-class standards.
- Employers need clear, work-relevant standards for effective recruitment of job applicants.
- Education and training institutions need measurable standards in order to tailor and teach curriculum to those standards.
- Purchasers of training, including students, taxpayers, and private industry councils, need standards in order to ensure their return on investment.[5]

TSDP is designed to be a business-driven initiative with standards that are set by industry, not government. Reflecting this perception, a five-member, gubernatorially appointed Texas Skills Development Program Panel was named in May 1992. Membership for the panel was drawn from representatives of labor and individual employers. As a steering committee for the program, the panel's responsibilities included oversight of the "model" standard-setting activities that occurred during the summer of 1992, as well as recommending the long-term state strategy for establishing and certifying occupational skills.

An Experiment in Setting Industry-Derived Standards

The TSDP panel was formally convened by the Department of Commerce in July 1992 to initiate the process of setting skill standards. Although emphasis was placed on establishing industry-set standards, the department's Work Force Development Division took the lead in organizing the TSDP panel's activities. A six-step process was devised for arriving at standards:

- identify and select initial targeted industries and occupations;
- identify and obtain world-class standards/benchmarks;
- identify and obtain any existing relevant benchmarks already set by business, industry, and labor;
- establish a methodology or model for setting standards;
- establish a method of validation; and
- establish a structure and funding mechanism for setting and validating standards.[6]

The Department of Commerce selected the initial occupations for which standards would be set. It also chose the "model" standard-setting methodology that focus groups, derived from the panel's members organizations, would use. Based on

SOCRATES-generated labor market information and a multiplicity of state agency-determined target industry lists, five industries and ten occupations were selected for standard setting:

- health care services—medical assistant, other medical technicians;
- petro-chemical—environmental technician, chemical technician;
- business/management services—computer operator, systems analyst;
- electrical/electronic equipment—electrical engineering technician, industrial electronic equipment repairer; and
- miscellaneous manufacturing and engineering—manufacturing technician, computer-integrated manufacturing technician.[7]

Ultimately, the business/management services automation cluster was chosen as the initial target industry, and computer operator and systems analyst were identified as the initial target occupations.

After reviewing a number of job/task analysis models, a modified DACUM focus group process was chosen, using the V-TECS job duty and task materials as a point of departure. A focus group for each occupation was convened on August 26, 1992. Thirteen systems analysts and eight computer operators participated in these two model "test" groups. Firms represented included Motorola, Electronic Data Systems, LTV Aircraft Products Group, Southwestern Bell, IBM, Mitre, the Automation and Robotics Institute, and NASA. Members of each group spent the day addressing the duties, tasks, cues/perceptions, work steps, required knowledge, observable actions or behaviors, outcomes, and measures associated with their occupation.

Texas officials reached several conclusions from the focus groups.

- Business, industry, and labor were strongly interested in exploring how to identify occupation-related skill standards.
- Task requirements for an occupation could differ widely from company to company.
- The rate of change in occupations makes the type of task analysis used as the test model obsolete.
- Costs approaching $18,000 to $20,000 per occupation prohibited any expansion of the model approach.
- A Texas-specific methodology might conflict with national models currently under development.

A second TSDP panel meeting was held on September 23, 1992. At that meeting, substantive changes were made in the direction of the panel. The emphasis shifted from developing standards to connecting them directly with national research activities, finding and validating existing business and industry-developed standards, and marketing usage of these standards to Texas educators and training providers. The panel recommended to the Governor that Texas no longer be in the business of creating "home-grown" industry-specific skill standards.

Concurrent Standard Development Efforts

The TSDP panel effort to define industry-specific standards is not the only initiative involving standards setting in Texas. Although the Commerce Department and TSDP panel are attempting to identify industry-derived skill standards, other state and local groups are independently engaged in discussion and action involving separate yet related strands of standards development.

State Level. The seventy-second legislature mandated the creation of a Committee on Student Learning and charged this group with developing certificates of initial mastery. An education-based body, its membership includes the commissioner of education, the commissioner of higher education, and teachers. The committee's membership does not overlap with that of the TSDP panel. Representatives from the Tri-Agency Partnership, with links to both the TSDP panel and the QWFP committees, reported that they are "not hooked in" to this group. Concern was expressed by the Tri-Agency representatives that this committee was having difficulty moving constituencies from a credit-hour, sequence-of-courses approach to a skills-based, career-path strategy.

As the state-level Committee on Student Learning pursues certificates of initial mastery, local tech prep program practitioners are pursuing the development of certificates of advanced mastery.

A state Committee of Practitioners also exists, in response to the federal Perkins Act requirements. Based at the Texas Education Agency, the formal committee includes both secondary and postsecondary practitioners. The higher education members, representing the community and technical colleges, also have created their own informal practitioners committee. They, too, were reported to be wrestling with standards issues, but their strand is entwined with establishing program outcome standards for vocational education students.

Local Level. All JTPA service delivery areas (SDAs) must comply with statewide criteria for youth program competencies. There is no overlap, however, between these competencies and the competencies defined by the Secretary's Commission on Achieving Necessary Skills (SCANS). The JTPA competencies also are distinct from any criteria currently under development by the various state committees. With enactment of the JTPA reform amendments, further emphasis will be placed on occupational standards for both youth and adult training. There is a move to link competencies (especially SCANS) with the TSDP, which will provide support to the JTPA delivery system in implementing the reforms.

Despite earlier intentions, the QWFP committees have not been engaged in the TSDP standards development efforts. SCANS materials have been provided to the committees through the Tri-Agency partnership, but the state has pursued limited developmental work on SCANS with the committees.

Some QWFP committees are using the SCANS materials and the impetus of local tech prep initiatives to independently tackle standards and their usage. In Brazos Valley, Blinn College is using V-TECS duties and tasks validated by regional employers, combined with curriculum crosswalk software, to move its business program toward a competency-based curriculum.

Using SCANS-derived questions, the central Texas QWFP committee surveyed employers in its eight-county area to determine priority basic skills needs for entry-level employment. Plans are underway to develop standard competency lists for each of the region's targeted occupations. These lists will be validated by employers and then disseminated to all education and training providers in the region.

Concurrent with all of these activities, the state legislature's interest in creating performance-based funding criteria for education programs is intensifying the varied and volatile standards debate.

Issues for Consideration

The Texas experience highlights the following issues with critical implications for future state and federal skill standards development activities.

What Do Employers and Organized Labor Want? The move to create industry-specific skill standards is not consistent with the skill needs articulated by Texas employers who were interviewed. Instead, the SCANS three-part foundation of basic skills, thinking skills, and personal qualities are the "standards" that consistently strike a responsive chord. One employer, when describing the skills he sought in his employees, passed out his own copies of the SCANS three-part foundation. Comments were heard from both QWFP committees on the need to teach students "to learn how to learn."[8] As one QWFP committee coordinator said, "The first thing we hear from business people is reading, writing, basic math skills, life management skills, and work ethics. . . Employers are not talking about specific industry skills; they want a better quality person to train."[9]

Employers on the TSDP panel echoed the comments of their local counterparts. As described by one panel member, industry competition is creating more complicated entry-level responsibilities and also allowing less time for internal training, forcing employers to seek "better prepared students out of the schools."[10]

Information coming from a series of Texas SJTCC-sponsored business forums during the fall of 1992 also reinforces the message that businesses want schools and government to address the foundation skills and competencies described in the SCANS report.

SCANS competencies are seen as the starting point for employability, with occupation-specific skills coming afterward. The TSDP panel has advised the Department of Commerce that, "If you can ensure an employer SCANS skills for its workers, interest in core occupational specific skills will rise dramatically."

Although the voice of organized labor is faint, the message is clear. For labor, skill standards involve job access and job security issues. This community's interest and support for standards is tied directly to the availability of worker retraining programs.

Who Drives Standards Development? Setting standards and benchmarks for an industry generally is seen as an appropriate national agenda item. However, in the existing national standards vacuum, practitioners are using whatever pre-existing data they know to be already available—most commonly, the SCANS and V-TECS materials—to derive standards.

Concern has been expressed by state officials in Texas that national efforts are leaning toward working through national trade associations and industry groups to the exclusion of states. The state Commerce Department supports national review and analysis of existing skill standards and certification processes from industries and professional and technical associations, provided states play a central role in the implementation, promotion, dissemination, and maintenance of skill standards and certification among the various stakeholders.[11] Support also was stated for national testing and certification, but "nationals cannot institutionalize standards nationwide."[12]

There also is an implicit and deeply held assumption among local players that any state or national standards development effort must allow for regional or local employer validation of nationally devised standards. Any nationally driven or state-driven standards system that does not include this component is likely to meet resistance during implementation.

Curriculum is the Lock—What is the Key? How do you affect curriculum and build a skill-standard driven, not sequence-of-course based, educational continuum? For both state and local level practitioners and employers, merging standards into the schools' curricula design, curricula content, and teaching practice is seen as the key implementation struggle. The magnitude of this problem is daunting. Texas is a state with more than 1,000 independent elementary and secondary school districts and independent community and technical colleges. There is no statewide system to affect postsecondary community and technical college curriculum. Secondary school curriculum now is developed by a handful of experts at the universities, then approved by a state board as "essential elements." The essential elements prescribe course content but do not include any measure of proficiency. These elements, however, are used to drive statewide achievement testing, which in turn drives what teachers do in the classroom.

Educators on QWFP committees believe that their hands are tied when it comes to teaching what employers want rather than legislated mandates and school board requirements. Committee members also spoke of the need to better inform teachers about employer interests and to use standards to give teachers "delegation with accountability" as local school districts implement site-based management.

Lessons Learned from the Model Process. From the beginning, the Commerce Department viewed its model process as a test of the utility of a DACUM-type approach in generating detailed and meaningful occupational standards. After completing the initial focus groups, the TSDP panel was to advise the Governor on the potential of the model for broader application. The model experiment also was undertaken to determine the additional resources that would be required for developing and validating comprehensive standards for all critical occupations, and to ascertain the interest of business and industry in funding standards development activities.

The DACUM process and its output received generally favorable reviews from the focus group participants. Overall, the computer operators found the process more effective in identifying competencies for their occupation than did the system analysts. In response to the question, "Do you feel that an educator or training provider using these measures would obtain valid and reliable assessments of students' competency attainment?", the systems analysts gave only an overall score of 5.3 (with a score of 10 as most desirable or effective). The computer operator group gave an overall score of 8.0 in response to the same question. The system analysts also were more likely to feel that the process was inadequate for shaping long-range expected training outcomes for their occupation. The complexity of duties and the rapid rate of technological changes were noted as key reasons for the system analysts' responses.[13]

In the interviews for this case study, TSDP panel members expressed no commitment to pursuing the DACUM approach to skill standards development. The organized labor representative commented that the model approach was too time consuming and costly to pursue when trying to address multiple industries. One private sector member commented that the activity was valuable only when the input from the focus groups was used. Another private sector member wanted to see an emphasis on marketing the "message" to business and education rather than a focus on "mechanics." He expressed surprise at starting from ground zero, commenting that "there ought to be something already developed past the primer" that could be used as a starting point. Two members voiced the need for action over "scientific" research-oriented efforts, with one member asking for an outcome-oriented timetable. Several members mentioned offering support to existing local business and education workforce improvement efforts as an important panel role. As one member commented, "People think regionally in Texas."[14]

Resources Used to Support Standards Development

To date, all outside research support and staff costs for state-conducted industry-specific standards development have been supported by JTPA's 5 percent setaside funds. For fiscal 1993, the State Job Training Coordinating Council is considering the use of 20 percent funds allocated from the state's 8 percent JTPA setaside to support skill development program activities.

The Commerce Department maintains an interest in obtaining industry financial support for standards and certification activities. The opinion exists that there is the need for public "seed" money to initiate a standards development effort and to sustain skill certification activity.

Next Steps

The Commerce Department and the TSDP panel are continuing to make progress toward identifying industry-specific standards. Strategically, Texas officials are interested in being positioned to quickly begin implementing and using national standards once they are developed. Staff and TSDP panel members are considering the following next steps:

- "socializing" the issue of skill standards and demonstrating its relationship to a skilled workforce and economic competitiveness;
- marketing to key industry and labor associations and organizations to identify customer needs and demonstrate how standards can improve outcomes from public and private training providers;

- surveying business, industry, and labor associations and organizations to identify which industries already have occupational standards and which are interested in supporting such activities;
- promoting the dissemination of valid standards to Texas industries and to education and training providers;
- exploring strategies to objectively measure attainments of graduates and workers as the basis for certification; and
- continuing to monitor national activities and developing a model for Texas to distribute and validate national standards once they are available.[15]

Commerce staff members already have obtained occupational standards from the National Institute for Automotive Service Excellence. Work has begun on a model for disseminating these standards to the local QWFP committees and for obtaining validation from the private industry councils. The TSDP panel will report to the Governor on funding mechanisms, strategies, and future TSDP activities.

The state also has begun to respond to employers' demand for entry-level workers who have SCANS competencies. Linking the use of SCANS competencies to program year 1993 vocational education funding for both secondary and postsecondary education has been proposed. The Higher Education Coordinating Board issued new technical program guidelines based on SCANS to colleges in January 1993.

How to integrate the related yet conflicting strands of the skill standard development continuum remains an ongoing challenge. One Tri-Agency representative accurately summed it up by saying that there is "a lot of weaving" to be done.[16]

The 1993 Texas legislature enacted the Smart Jobs Training Fund by diverting unemployment insurance funds for training and retraining incumbent workers for high-skill, high-wage jobs. For the first year, it is estimated that $50 million will be available. The Governor views the fund as an essential component of the economic growth and competitiveness strategy for the state.

In another significant step, Texas also has committed $500,000 in JTPA and Perkins Act funds to a jointly issued request for proposal involving the Texas Department of Commerce, the Texas Education Agency, and the Higher Education Coordinating Board. The proposal seeks to advance the Texas skills development program through one or more state/local pilot projects. Projects that receive funding will use currently recognized industry skill standards to test their viability and utility within a regional labor market. These pilots are viewed as a capacity-building step that will assist the state in implementing national skill standards once they become available.

Endnotes

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